



WELDING LAB EXPANSION FOR:

GEORGETOWN CENTER FOR ADVANCED
MANUFACTURING
Georgetown, South Carolina 29440

Bidding Documents

May 16, 2023

Project Number: #23007

OSE Project #H59-N219-CB

adwarchitects
environmentsforlife

architecture planning interiors

six coliseum centre
2815 coliseum centre drive, suite 500
charlotte, nc 28217
704 379 1919 main
704 749 5561 direct
adwarchitects.com

<p>ARCHITECT:</p> <p>ADW Architects Robert Lauer, AIA Six Coliseum Centre 2815 Coliseum Centre Drive, Suite 500 Charlotte, NC 28217 Ph: 704 379 1919 blauer@adwarchitects.com</p>	  <p>5/16/2023</p>
<p>MECHANICAL AND PLUMBING ENGINEER</p> <p>James L. Currie, PE, LEED AP SCPE # 28761 CMTA, Inc. 8801 J M Keynes Dr #240 Charlotte, NC 28262 Ph. 704.376.7072 JCurrie@cmta.com</p>	  <p>05/16/2023</p>
<p>ELECTRICAL ENGINEER</p> <p>Tyler A. Tucker SCPE # 27824 CMTA, Inc. 8801 J M Keynes Dr #240 Charlotte, NC 28262 Ph. 704.376.7072 ttucker@cmta.com</p>	  <p>05/16/2023</p>

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PROJECT NUMBER: H59-N219-CB

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ADVANCED MANUFACTURING**

Project Location: GEORGETOWN, SC

ADW Project Number: 23007

OSE PROJECT#: H59-N219-CB

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SE-310 INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES

AGENCY: HGTC - Horry-Georgetown Technical College

PROJECT NAME: HGTC - Expand Welding Booths at GT AMC

PROJECT NUMBER: H59-N219-CB CONSTRUCTION COST RANGE: \$300,000 to \$400,000

PROJECT LOCATION: Georgetown Technical College

DESCRIPTION OF PROJECT/SERVICES: *(450 character limit)*

• The scope of the project is to upfit existing space that will increase the number of welding booths in the Advanced Manufacturing Center from 20 to 30 and some site work to remove existing curb and add concrete pad. Professional work will include plumbing, HVAC, and electrical.

BID/SUBMITTAL DUE DATE: 06/29/2023 TIME: 10:00 AM NUMBER OF COPIES: 1

PROJECT DELIVERY METHOD: Design-Bid-Build

AGENCY PROJECT COORDINATOR: Kevin Brown, Superintendent of Building and Grounds

EMAIL: kevin.brown@hgtc.edu TELEPHONE: (843) 349-5398

DOCUMENTS OBTAINED FROM: College website at www.hgtc.edu/purchasing (Construction Projects)

BID SECURITY IS REQUIRED IN AN AMOUNT NOT LESS THAN 5% OF THE BASE BID.

PERFORMANCE AND LABOR & MATERIAL PAYMENT BONDS: The successful Contractor will be required to provide Performance and Labor and Material Payment Bonds, each in the amount of 100% of the Contract Price.

DOCUMENT DEPOSIT AMOUNT: \$0.00 IS DEPOSIT REFUNDABLE: Yes No N/A

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

Agency **WILL NOT** accept Bids sent via email.

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

A/E NAME: ADW Architects A/E CONTACT: Phillip Steele

EMAIL: psteele@adwarchitects.com TELEPHONE: (704) 749-5561

PRE-BID CONFERENCE: Yes No MANDATORY ATTENDANCE: Yes No

PRE-BID DATE: 06/14/2023 TIME: 02:00 PM

PRE-BID PLACE: GEORGETOWN Campus, Advanced Manufacturing Center Conference Room

BID OPENING PLACE: CONWAY Campus, Bldg. 100, Room 122

BID DELIVERY ADDRESSES:

HAND-DELIVERY:

Attn: Dianna Cecala, Procurement Manager

2050 Hwy 501 E, Bldg. 100, Room 120

Conway, SC 29526

MAIL SERVICE:

Attn: Dianna Cecala, Procurement Manager

PO Box 261996

Conway, SC 29528

IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? Yes No

APPROVED BY:



DATE: 06/05/2023

(OSE PROJECT MANAGER)

**South Carolina Division of Procurement
Services, Office of the State Engineer Version of
 AIA[®] Document A701[™] – 1997**

Instructions to Bidders

This version of AIA Document A701[™]–1997 is modified by the South Carolina Division of Procurement Services, Office of the State Engineer (“SCOSE”). Publication of this version of AIA Document A701–1997 does not imply the American Institute of Architects’ endorsement of any modification by SCOSE. A comparative version of AIA Document A701–1997 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as “AIA Document A701[™]– 1997, Instructions to Bidders — SCOSE Version,” or “AIA Document A701[™]–1997 — SCOSE Version.”

South Carolina Division of Procurement Services, Office of the State Engineer Version of AIA® Document A701™ – 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address)

GCAM-WELDING LAB EXPANSION H59-N219-CB

4003 South Fraser Street, Georgetown, SC 29440

THE OWNER:

(Name, legal status and address)

Horry Georgetown Technical College

P. O. Box 261966

Conway, SC 29528-6066

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE ARCHITECT:

(Name, legal status and address)

ADW Architects, PA

2815 Coliseum Centre Drive, Suite 500

Charlotte, NC 28217

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- 5 CONSIDERATION OF BIDS
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- 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

This version of AIA Document A701–1997 is modified by the South Carolina Division of Procurement Services, Office of the State Engineer. Publication of this version of AIA Document A701 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of the State Engineer. A comparative version of AIA Document A701–1997 showing additions and deletions by the South Carolina Division of Procurement Services, Office of the State Engineer is available for review on South Carolina state Web site.

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

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ARTICLE 1 DEFINITIONS

§ 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, Supplementary Instructions to Bidders, the Bid Form, the Notice of Intent to Award, 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 and 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 AIA Document A101™–2007 Standard Form of Agreement Between Owner and Contractor, SCOSE edition. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean AIA Document A201™–2007 General Conditions of the Contract for Construction, SCOSE edition.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by submitting a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents and Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction. 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.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents 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.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

§ 2.1.5 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.

§ 2.1.5.1 By submitting a 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:
 - .1 those prices;
 - .2 the intention to submit a bid; or
 - .3 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.

§ 2.1.5.2 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 Section 2.1.5.1 of this certification; or
- .2 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 Section 2.1.5.1 of this certification [As used in this subdivision, the term "principals" means the person(s) in the bidder's organization responsible for determining the prices offered in this bid];
- .3 As an authorized agent, does certify that the principals referenced in Section 2.1.5.2.2 of this certification have not participated, and will not participate, in any action contrary to Section 2.1.5.1 of this certification; and
- .4 As an agent, has not personally participated, and will not participate, in any action contrary to Section 2.1.5.1 of this certification.

§ 2.1.5.3 If the bidder deletes or modifies Section 2.1.5.1.2 of this certification, the bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

§ 2.1.6 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.

§ 2.1.7 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

§ 2.1.7.1 By submitting a Bid, Bidder certifies, to the best of its knowledge and belief, that:

- .1 Bidder and/or any of its Principals-
 - .1 Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;
 - .2 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
 - .3 Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in Section 2.1.7.1.1.2 of this provision.
- .2 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.

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- 3 "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).

§ 2.1.7.2 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.

§ 2.1.7.3 If Bidder is unable to certify the representations stated in Section 2.1.7.1, 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.

§ 2.1.7.4 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 Section 2.1.7.1 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.

§ 2.1.7.5 The certification in Section 2.1.7.1 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.

§ 2.1.8 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 the 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, the 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.

§ 2.1.9 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.

§ 2.1.9.1 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.

§ 2.1.9.2 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*.

§ 2.1.9.3 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.

§ 2.1.10 IRAN DIVESTMENT ACT CERTIFICATION

§ 2.1.10.1 The Iran Divestment Act List is a list published by the State Fiscal Accountability Authority pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the

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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.

§ 2.1.10.2 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.

§ 2.1.10.3 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.

§ 2.1.11 OPEN TRADE REPRESENTATION (JUN 2015)

By submitting an Offer, the Offeror represents that Offeror is not currently engaged in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in SC Code Section 11-35-5300. [02-2A083-1]

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 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 (10) 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.

§ 3.1.2 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.3 The Owner has made copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.1.4 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.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least ten (10) days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by written Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them. 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.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. 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.

§ 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 (10) 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.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 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.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

§ 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, the 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.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the SE-330 Bid Form included with the Bidding Documents.

§ 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.

§ 4.1.3 Sums shall be expressed in figures.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid. 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.

§ 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."

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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.

§ 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.

§ 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.

§ 4.2 BID SECURITY

§ 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.

§ 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.

§ 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.

§ 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.

§ 4.3 SUBMISSION OF BIDS

§ 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.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

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§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 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.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 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.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

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

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

§ 5.1.3 The 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 the Owner determines to award the Project, the 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, the Owner will open and consider the Bid.

§ 5.2 REJECTION OF BIDS

§ 5.2.1 The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 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.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 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.

§ 6.2 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 E (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].

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 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.

§ 7.2 TIME OF DELIVERY CONTRACT, CERTIFICATES OF INSURANCE AND FORM OF BONDS

§ 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 (7) days thereafter. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three (3) 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.

§ 7.2.2 The bonds shall be dated on or after the date of the Contract.

§ 7.2.3 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor, SCOSE edition.

ARTICLE 9 MISCELLANEOUS

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

§ 9.1.1 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.

§ 9.1.2 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

§ 9.1.3 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).

§ 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

§ 9.3.1 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that the 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.

§ 9.3.2 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that the Bidder contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act.

§ 9.3.3 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that the Bidder contends is protected by Section 11-35-1810.

§ 9.3.4 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.

§ 9.3.5 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

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(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.

§ 9.3.6 In determining whether to release documents, the State will detrimentally rely on the Bidders' marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED".

§ 9.3.7 By submitting a response, the 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

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

Room or Area of Posting: Room 122

Building Where Posted: Building 100

Address of Building: 2050 Hwy 501 E, Conway, SC 20526

WEB site address (if applicable): <https://www.hgtc.edu/purchasing>

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

§ 9.5.1 Any prospective bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen (15) 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 (10) 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.

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

- .1 by email to protest-ose@mmo.sc.gov,
- .2 by facsimile at 803-737-0639, or
- .3 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.

§ 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

§ 9.8.1 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.

§ 9.8.2 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.

§ 9.8.3 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

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Horry-Georgetown Technical College
PO Box 261966
Conway, SC 29528-6066

BOND AMOUNT: \$

PROJECT:

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

HGTC GCAM Welding Expansion
H59-N219-CB
4003 South Fraser Street
Georgetown, SC 29440

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

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

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

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

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so

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furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

_____ (Contractor as Principal) (Seal)

_____ (Witness)

_____ (Title)

_____ (Surety) (Seal)

_____ (Witness)

_____ (Title)

Additions and Deletions Report for ***AIA® Document A310™ – 2010***

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 14:34:45 ET on 06/05/2023.

PAGE 1

Horry-Georgetown Technical College
PO Box 261966
Conway, SC 29528-6066

...

HGTC GCAM Welding Expansion
H59-N219-CB
4003 South Fraser Street
Georgetown, SC 29440

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 14:34:45 ET on 06/05/2023 under Order No. 4104238572 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ – 2010, Bid Bond, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

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: _____
(Owner's Name)

FOR: PROJECT NAME: HGTC - GCAM Welding Lab Expansion
PROJECT NUMBER: H59-N219-CB

OFFER

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

§ 2. Pursuant to SC Code § 11-35-3030(1), Bidder has submitted Bid Security 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): N/A

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

(Bidder to 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): N/A

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): N/A

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): N/A

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
<u>1.</u>	<u>N/A</u>	_____	<u>\$</u> _____	<u>\$</u> _____
<u>2.</u>	<u>N/A</u>	_____	<u>\$</u> _____	<u>\$</u> _____
<u>3.</u>	<u>N/A</u>	_____	<u>\$</u> _____	<u>\$</u> _____
<u>4.</u>	<u>N/A</u>	_____	<u>\$</u> _____	<u>\$</u> _____
<u>5.</u>	<u>N/A</u>	_____	<u>\$</u> _____	<u>\$</u> _____
<u>6.</u>	<u>N/A</u>	_____	<u>\$</u> _____	<u>\$</u> _____

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 Specialty Classification work listed:

(A) SUBCONTRACTOR SPECIALTY <i>(Completed by Owner)</i>	(B) CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION <i>(Completed by Owner)</i>	(C) SUBCONTRACTOR'S or PRIME CONTRACTOR'S NAME <i>(Required - must be completed by Bidder)</i>	(D) SUBCONTRACTOR'S or PRIME CONTRACTOR'S SC LICENSE NUMBER <i>(Requested, but not Required)</i>
BASE BID			
Mechanical	AC		
Electrical	EL		
Plumbing	PB		
ALTERNATE #1			
N/A			
N/A			
N/A			
N/A			
ALTERNATE #2			
N/A			
N/A			
N/A			
ALTERNATE #3			
N/A			
N/A			
N/A			

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 an Owner-developed list of contractor/subcontractor specialties by contractor license classification or subclassification for which Bidder is required to identify the entity (subcontractor(s) and/or himself) Bidder will use to perform the work of each listed specialty.
 - a. **Columns A & B:** The Owner fills out these columns to identify the contractor/subcontractor specialty and related license abbreviation for which the Bidder must list either a subcontractor or himself as the entity that will perform this work. In Column A, the subcontractor specialty is identified by name and in Column B, the related contractor license abbreviation (per Title 40 of the SC Code of Laws) is listed. Abbreviations of licenses can be found at: <http://www.llr.state.sc.us/POL/Contractors/PDFFiles/CLBClassificationAbbreviations.pdf> . If the owner has not identified a specialty, the Bidder does not list a subcontractor.
 - b. **Columns C and D:** In these columns, the Bidder identifies the subcontractors it will use for the work of each specialty and license listed by the Owner in columns A & B. Bidder must identify only the subcontractor(s) who will perform the work and no others. Bidders should make sure that their identification of each subcontractor is clear and unambiguous. A listing that could be any number of different entities may be cause for rejection of the bid as non-responsive. For example, a listing of M&M without additional information may be problematic if there are multiple different licensed contractors in South Carolina whose names start with M&M.
2. **Subcontractor Defined:** For purposes of subcontractor listing, a subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site pursuant to a contract with the prime contractor. Bidder should not identify sub-subcontractors in the spaces provided on the bid form but only those entities with which Bidder will contract directly. Likewise, do not identify material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the Bidder or proposed subcontractor(s).
3. **Subcontractor Qualifications:** Bidder must only list subcontractors who possess a South Carolina contractor's license that includes the license classification and/or subclassification identified by the Owner in columns A & B. The subcontractor license must also be within the appropriate license group for the work of the specialty. If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsive.
4. **Use of Own forces:** If, under the terms of the Bidding Documents and SC Contractor Licensing laws, Bidder is qualified to perform the work of a listed specialty 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 specialty.
5. **Use of Multiple Subcontractors:**
 - a. If Bidder intends to use multiple subcontractors to perform the work of a single specialty 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 specialty listing and to use one or more subcontractors to perform the remaining work for that specialty listing, Bidder must insert his own name and the name of each subcontractor, preferably separating the name of each with the word **"and"**. Bidder must use each entity listed for the work of a single specialty listing in the performance of that work.
 - b. **Optional Listing Prohibited:** Bidder may not list multiple subcontractors for a specialty listing, in a form that provides the Bidder the option, after bid opening or award, to choose one or more but not all the listed subcontractors to perform the work for which they are listed. A listing, which on its face requires subsequent explanation to determine whether it is an optional listing, is non-responsive. If Bidder intends to use multiple entities to perform the work for a single specialty 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 specialty. Agency 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 Agency may reasonably interpret as an optional listing.
6. If Bidder is awarded the contract, Bidder must, except with the approval of the Agency for good cause shown, use the listed entities to perform the work for which they are listed.
7. If Bidder is awarded the contract, Bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
8. Bidder's failure to identify an entity (subcontractor or himself) to perform the work of a subcontractor specialty listed in columns A & B 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 § 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 120 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 \$ 250 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 SCOSE Version of the AIA A701, Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

**South Carolina Division of Procurement
Services, Office of State Engineer Version of
 AIA[®] Document A101[®] – 2017**

***Standard Form of Agreement Between Owner and
Contractor where the basis of payment is a Stipulated Sum***

This version of AIA Document A101[®]–2017 is modified by the South Carolina Division of Procurement Services, Office of State Engineer (“SCOSE”). Publication of this version of AIA Document A101–2017 does not imply the American Institute of Architects’ endorsement of any modification by SCOSE. A comparative version of AIA Document A101–2017 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as “AIA Document A101[®]–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum — SCOSE Version,” or “AIA Document A101[®]–2017 — SCOSE Version.”

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _____ day of _____
in the year _____
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Horry-Georgetown Technical College
P.O. Box 261966
Conway, SC 29528-6066

The Owner is a Governmental Body of the State of South Carolina as defined in S.C. Code Ann. § 11-35-310.

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, State Project Number, location and detailed description)

HGTC GCAM Welding Lab Expansion
H59-N219-CB
4003 South Fraser Street, Georgetown, SC 29440

The Architect:
(Name, legal status, address and other information)

ADW Architects, PA
2815 Coliseum Centre Drive, Suite 500
Charlotte, NC 28217

The Owner and Contractor agree as follows.

This version of AIA Document A101–2017 is modified by the South Carolina Division of Procurement Services, Office of State Engineer. Publication of this version of AIA Document A101 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of State Engineer. A comparative version of AIA Document A101–2017 showing additions and deletions by the South Carolina Division of Procurement Services, Office of State Engineer is available for review on South Carolina state Web site.

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

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

§ 1.2 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 A101-2017 Standard Form of Agreement Between Owner and Contractor, SCOSE Version. 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 A201-2017 General Conditions of the Contract for Construction, SCOSE Version.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 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 (7) 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.

§ 3.2 The Contract Time as provided in the Notice to Proceed for this project shall be measured from the Date of Commencement of the Work to Substantial Completion.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work within the Contract Time indicated in the Notice to Proceed.

§ 3.3.2 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

Init.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum, including all accepted alternates indicated in the bid documents, in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be

(\$ _____), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates that are accepted, if any, included in the Contract Sum:

(Insert the accepted Alternates.)

Item	Price
------	-------

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price
------	-------

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.5 Liquidated damages

§ 4.5.1 Contractor agrees that from the compensation to be paid, the Owner shall retain as liquidated damages the amount indicated in Section 9(b) of the Bid Form 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. The liquidated damages amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

Init.

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect and Owner by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than twenty-one (21) days after receipt of the Application for Payment.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to S.C. Code Ann. § 12-8-550 (Withholding Requirements for Payments to Non-Residents), in accordance with AIA Document A201®–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold three and one-half percent (3.5%), as retainage, from the payment otherwise due.

§ 5.1.7.2 When a portion, or division, of Work as listed in the Schedule of Values is 100% complete, that portion of the retained funds which is allocable to the completed division must be released to the Contractor. No later than ten (10) days after receipt of retained funds from the Owner, the Contractor shall pay to the subcontractor responsible for such completed work the full amount of retainage allocable to the subcontractor's work.

§ 5.1.7.3 Upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.

Init.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than twenty-one (21) days after the issuance of the Architect’s final Certificate for Payment.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Claims and disputes shall be resolved in accordance with Article 15 of AIA Document A201–2017.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:

§ 8.2.1 The 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:**
- Title:**
- Address:**
- Telephone:**
- Email:**

§ 8.2.2 The 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:**
- Title:**
- Address:**
- Telephone:**
- Email:**

§ 8.3 The Contractor’s representative:

§ 8.3.1 The 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:**

Init.

Title:
Address:
Telephone:
Email:

§ 8.3.2 The 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:
Title:
Address:
Telephone:
Email:

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 The Architect's representative:

Name:
Title:
Address:
Telephone:
Email:

§ 8.6 Insurance and Bonds

§ 8.6.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101®–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.6.2 The Contractor shall provide bonds as set forth in AIA Document A101®–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.7 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.8 Other Provisions:

§ 8.8.1 Additional requirements, if any, for the Contractor's Construction 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 milestone dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents.

- .1 Upon review by the Owner and the Architect for conformance with milestone dates and Construction Time given in the Bidding Documents, with associated Substantial Completion date, the Construction Schedule shall be deemed part of the Contract Documents and attached to the Agreement as an Exhibit. If returned for non-conformance, the Construction Schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted.

Init.

- .2 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 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 Construction Schedule to reflect such conditions.
- .3 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.
- .4 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.

§ 8.8.2 The Owner’s review of the Contractor’s schedule is not conducted for the purpose of either determining its accuracy, completeness, or approving the construction means, methods, techniques, sequences or procedures. The Owner’s review shall not relieve the Contractor of any obligations.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101®–2017, SCOSE Version Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101®–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201®–2017, SCOSE Version General Conditions of the Contract for Construction
- .4 Form SE-390, Notice to Proceed – Construction Contract
- .5 Drawings

Number	Title	Date
--------	-------	------

- .6 Specifications

Section	Title	Date	Pages
---------	-------	------	-------

- .7 Addenda, if any:

Number	Date	Pages
--------	------	-------

Init.

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

The Sustainability Plan:

Title	Date	Pages
-------	------	-------

Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201®–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

- Form SE-310, Invitation for Construction Services**
- Instructions to Bidders (AIA Document A701-2018 OSE Version)**
- Form SE-330, Contractor’s Bid (Completed Bid Form)**
- Form SE-370, Notice of Intent to Award**
- Certificate of Procurement Authority issued by the State Fiscal Accountability Authority**

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)

Init.

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

for the following **PROJECT:**
(Name, State Project Number, and location or address)

HGTC GCAM Welding Lab Expansion
H59-N219-CB
4003 South Fraser Street, Georgetown, SC 29440

THE OWNER:
(Name, legal status and address)

Horry-Georgetown Technical College
P.O. Box 261966
Conway, SC 29528-6066

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE CONTRACTOR:
(Name, legal status and address)

This version of AIA Document A101–2017 Exhibit A is modified by the South Carolina Division of Procurement, Office of State Engineer. Publication of this version of AIA Document A101 Exhibit A does not imply the American Institute of Architects' endorsement of any modification by the South Carolina Division of Procurement, Office of State Engineer.

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

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201®–2017, General Conditions of the Contract for Construction, SCOSE Version.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Reserved

§ A.2.3.1 Reserved

§ A.2.3.1.1 Reserved

§ A.2.3.1.2 Reserved

§ A.2.3.1.3 Reserved

§ A.2.3.1.4 Reserved

§ A.2.3.2 Reserved

§ A.2.3.3 Reserved

§ A.2.4 Optional Insurance.

The Owner shall purchase and maintain any insurance selected below.

§ A.2.4.1 Other Insurance

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies. 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.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the

Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.1.4 A failure by the Owner to either (i) demand a certificate of insurance or written endorsement required by Section A.3, or (ii) reject a certificate or endorsement on the grounds that it fails to comply with Section A.3, shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, for such other period for maintenance of completed operations coverage as specified in the Contract Documents, or unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than \$1,000,000 each occurrence, \$1,000,000 general aggregate, \$1,000,000 aggregate for products-completed operations hazard, \$1,000,000 personal and advertising injury, \$50,000 fire damage (any one fire), and \$5,000 medical expense (any one person) providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than \$1,000,000 per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability, Employers Liability, and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers. The umbrella policy limits shall not be less than \$3,000,000.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than \$100,000 each accident, \$100,000 each employee, and \$500,000 policy limit for claims, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks.

§ A.3.2.8 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.9 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.3 Required Property Insurance

§ A.3.3.1 The Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Contractor's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.3.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds.

§ A.3.3.1.1 **Causes of Loss.** The insurance required by this Section A.3.3.1 shall provide coverage for direct physical loss or damage and shall include the risks of fire (with extended coverage), explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, workmanship, or materials.

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss

Sub-Limit

§ A.3.3.1.2 **Specific Required Coverages.** The insurance required by this Section A.3.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. *(Indicate below the cause of loss and any applicable sub-limit.)*

Init.

§ A.3.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall replace the insurance policy required under Section A.3.3.1 with property insurance written for the total value of the Project.

§ A.3.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.3.3 is subject to deductibles or self-insured retentions, the Contractor shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.3.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.3.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.3.3.3 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.

§ A.3.3.4 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 A.3.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ A.3.4 Contractor's Other Insurance Coverage

§ A.3.4.1 Insurance selected and described in this Section A.3.4 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.4.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.4.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

§ A.3.4.2.1 Reserved

§ A.3.4.2.2 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

§ A.3.4.2.3 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

§ A.3.4.2.4 Boiler and Machinery Insurance
The Contractor shall purchase and maintain boiler and machinery insurance as required, 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 be named insureds.

§ A.3.5 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

§ A.3.5.1 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 be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

§ A.3.5.2 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.

§ A.3.5.3 Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

AIA[®] Document A201[™] – 2007 Instructions

General Conditions of the Contract for Construction

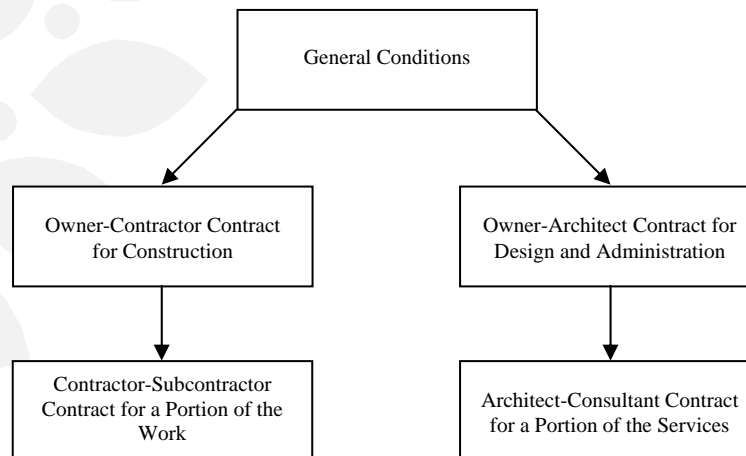
GENERAL INFORMATION

Purpose. AIA Document A201–2007, a general conditions form, is considered the keystone document of the Conventional (A201) Family of Documents because it provides the terms and conditions under which the Owner, Contractor and Architect will work together during the building construction process. When adopted into an Owner-Contractor agreement, A201–2007 provides an essential component of the construction contract. In addition, A201–2007 is incorporated by reference into the Owner-Architect and Contractor-Subcontractor agreements in the A201 Family, thus establishing a common basis for the primary and secondary relationships on the typical medium to large size, or complex (involving fast track scheduling or multiple bid packages) construction project.

For smaller or less complex construction projects, document users should consider using A107[™]–2007, Agreement Between Owner and Contractor for Projects of a Limited Scope. For single family residential projects, or even smaller and less complex commercial projects, users may wish to consider A105[™]–2007, Agreement Between Owner and Contractor for a Residential or Small Commercial Project.

Related Documents. A201–2007 is incorporated by reference into three AIA Owner-Contractor agreements, A101[™]–2007, A102[™]–2007, and A103[™]–2007; into A401[™]–2007, Agreement Between Contractor and Subcontractor; and into two AIA Owner-Architect agreements, B101[™]–2007 and B103[™]–2007. A201–2007 may be adopted by indirect reference into the Architect-Consultant agreement when the prime Agreement between the Owner and Architect adopts A201–2007 and it is in turn adopted into the Architect-Consultant agreement, AIA Document C401[™]–2007. Such incorporation by reference is a valid legal drafting method, and documents so incorporated are generally interpreted as part of the respective contract.

The Contract Documents, including A201–2007, record the Contract for Construction between the Owner and the Contractor. The other Contract Documents are the Owner-Contractor agreement, Supplementary Conditions, Drawings, Specifications, and Modifications. Although the AIA does not produce standard documents for Supplementary Conditions, Drawings or Specifications, a variety of model and guide documents are available, including AIA’s MASTERSPEC and AIA Document A503[™]–2007, Guide for Supplementary Conditions. As mentioned above and diagrammed below, A201–2007 is a vital document used to allocate the proper legal responsibilities of the parties.



On construction projects, contractual relationships are created between owners, architects, architects’ consultants, contractors, subcontractors, sub-subcontractors, and others down through the multiple tiers of participants. If custom-crafted agreements were written in isolation for each of those contractual relationships, the problems of overlaps and gaps in the numerous participants’ responsibilities could lead to mass confusion and chaos. To prevent and solve this problem, the construction industry commonly uses standardized general conditions, such as AIA Document A201–2007, for coordinating those many relationships on the project by its adoption into each contract.

The AIA expends significant time and resources in the development of A201 and its related agreements to provide coordinated linkages in the tiers of legal relationships. AIA documents related to A201 are crafted with common phrasing, uniform definitions and a consistent, logical allocation of responsibilities down through the tiers of relationships. Together these documents are known as the Conventional (A201) Family of Documents, and are listed below:

- A101™–2007, Agreement Between Owner and Contractor (Stipulated Sum)
- A102™–2007, Agreement Between Owner and Contractor (Cost Plus Fee, with GMP)
- A103™–2007, Agreement Between Owner and Contractor (Cost Plus Fee, without GMP)
- A401™–2007, Agreement Between Contractor and Subcontractor
- A503™–2007, Guide for Supplementary Conditions
- A701™–1997, Instructions to Bidders
- B101™–2007, Agreement Between Owner and Architect
- B103™–2007, Agreement Between Owner and Architect for a Large or Complex Project
- B201™–2007, Architect's Services: Design and Construction Contract Administration
- B209™–2007, Architect's Services: Construction Contract Administration
- B503™–2007, Guide for Amendments to AIA Owner-Architect Agreements
- C401™–2007, Agreement Between Architect and Consultant

The A201 Family is augmented by a number of standard contract administration documents (G-series) used generally for processing payments to the Contractor and formalizing changes in the Work.

The AIA publishes two other general conditions documents that parallel A201–2007, one for the Construction Management-Adviser Family of Documents, AIA Document A201™CMa–1992, and the other for the Interiors Family of Documents, AIA Document A251™–2007.

Dispute Resolution—Mediation and Arbitration. This document contains provisions for mediation and arbitration of claims and disputes. Mediation is a non-binding process, but is mandatory under the terms of this document. Arbitration is no longer mandatory under the terms of the 2007 Conventional (A201) Family of Documents but may be selected in the Owner-Contractor agreement. If arbitration is selected as the method of binding dispute resolution, that selection is binding in most states and under the Federal Arbitration Act. In a minority of states, arbitration provisions relating to future disputes are not enforceable but the parties may agree to arbitrate after the dispute arises. Even in those states, under certain circumstances (for example, in a transaction involving interstate commerce), arbitration provisions may be enforceable under the Federal Arbitration Act.

The AIA does not administer dispute resolution processes. To submit disputes to mediation or arbitration or to obtain copies of the applicable mediation or arbitration rules, call the American Arbitration Association at (800) 778-7879, or visit their Web site at www.adr.org.

Why Use AIA Contract Documents. AIA contract documents are the product of a consensus-building process aimed at balancing the interests of all parties on the construction project. The documents reflect actual industry practices, not theory. They are state-of-the-art legal documents, regularly revised to keep up with changes in law and the industry—yet they are written, as far as possible, in everyday language. Finally, AIA contract documents are flexible: they are intended to be modified to fit individual projects, but in such a way that modifications are easily distinguished from the original, printed language.

Use of Non-AIA Forms. If a combination of AIA documents and non-AIA documents is to be used, particular care must be taken to achieve consistency of language and intent among documents.

Standard Forms. Most AIA documents published since 1906 have contained in their titles the words "Standard Form." The term "standard" is not meant to imply that a uniform set of contractual requirements is mandatory for AIA members or others in the construction industry. Rather, the AIA standard documents are intended to be used as fair and balanced baselines from which the parties can negotiate their bargains. As such, the documents have won general acceptance within the construction industry and have been uniformly interpreted by the courts. Within an industry spanning 50 states—each free to adopt different, and perhaps contradictory, laws affecting that industry—AIA documents form the basis for a generally consistent body of construction law.

Use of Current Documents. Prior to using any AIA Contract Document, users should consult www.aia.org or a local AIA component to verify the most recent edition.

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CHANGES FROM THE PREVIOUS EDITION

AIA Document A201–2007 revises the 1997 edition of A201 to reflect changes in construction industry practices and the law. Comments and assistance in this revision were received from numerous individuals and organizations, including those representing owners, architects, engineers, specifiers, general contractors, subcontractors, independent insurance agents, sureties, attorneys and arbitrators.

A number of substantial changes have been made to A201–2007. The principal changes are described below:

Article 1. A definition of Instruments of Services is now added and the ownership and use of drawings, specifications and other instruments of services is further clarified. Additionally, the parties are now required to establish necessary protocols to govern the electronic transmission of data. This article also adds Initial Decision Maker as a defined term (refer to Article 15).

Article 2. Following commencement of the Work, the Contractor may only require the Owner to provide reasonable evidence that adequate financial arrangements have been made if certain enumerated conditions (of a type that would cause the Contractor to have concerns about the Owner’s ability to meet its financial obligations) exist.

Article 3. Since 1997, many construction projects have suffered delays due the discovery of burial grounds, archaeological sites, and wetlands. New Section 3.7.5 addresses the Owner’s and Contractor’s responsibilities in the event these are not noted on the Contract Documents, but discovered during construction. Section 3.3.1 now clarifies the extent of the Owner’s responsibility for the costs associated with Owner-required means and methods of construction. Also, new requirements for the Contractor to notify the owner of its proposed superintendent are set out in Section 3.9.

Article 4. This article is revised to coordinate with changes to the 2007 AIA Owner-Architect agreements that incorporate A201–2007 and is now re-titled “Architect.” The process for making, deciding and resolving Claims is substantially revised and is relocated from Article 4 to a new Article 15.

Article 7. Section 7.3.9 is now revised to provide a more efficient process for making payments to the Contractor for changes to the Work completed under Construction Change Directives.

Article 9. New Section 9.5.3 allows the Owner to issue joint checks, if the Architect withholds certification for payment as a result of the Contractor’s failure to make payments properly to the Subcontractors or to lower tier subcontractors and suppliers. Section 9.5.3 now grants the Owner authority to request written evidence from the Contractor that the Contractor has properly paid the Subcontractors, etc.

Article 10. New Section 10.3.5 now adds a reciprocal indemnity provision whereby the Contractor indemnifies the Owner for costs and expenses related to hazardous materials the Contractor brings to the site and negligently handles, except where such costs and expenses are due to the Owner’s fault or negligence.

Article 11. This article deletes the optional Project Management Protective Liability insurance added in 1997 to cover vicarious liability for construction operations. To diminish the costs to the Project team of third-party claims, a new Section 11.1.4 requires the Contractor to add the Owner, Architect and Architect's consultants as additional insureds on its commercial liability coverage for claims caused by the Contractor's negligence during the Contractor's operations. The Contractor is also required to add the Owner as an additional insured on its commercial liability coverage for claims caused by the Contractor's negligence during the Contractor's completed operations.

Article 13. Section 13.5.1 now makes the Owner responsible for the costs of tests when applicable codes, such as the International Building Code, prohibit the Owner from delegating the costs. Section 13.7, establishing the time period in which the Owner and Contractor must bring Claims, is amended to more closely follow state statutes of limitations and repose and to require compliance with state law.

Article 15. New Article 15 consists of revised Claims and Disputes language from Article 4 of A201™–1997. Article 5 introduces the concept of an Initial Decision Maker (IDM). Unlike the 1997 edition, A201–2007 allows for Claims to be decided initially by someone other than the Architect. The Owner and the Contractor have an opportunity to identify an IDM other than the Architect in the Owner-Contractor agreement. If the Owner and Contractor do not select a third party IDM, however, the Architect will serve as the IDM, thus maintaining its traditional role as the initial decider of Claims. For most Claims, a decision by the IDM remains a condition precedent to proceeding to mediation. As in A201–1997, mediation is a condition precedent to the method of binding dispute resolution selected in the Owner-Contractor agreement. While arbitration is no longer mandatory in the 2007 Conventional (A201) Family of Documents, Article 15 sets forth the requirements for arbitration if it is the selected method of binding dispute resolution. Unlike in the 1997 edition, however, A201–2007 allows for consolidation of arbitrations and joinder of necessary third parties.

USING A201–2007

Modifications. Particularly with respect to professional or contractor licensing laws, building codes, taxes, monetary and interest charges, arbitration, indemnification, format and font size, AIA Contract Documents may require modification to comply with state or local laws. Users are encouraged to consult an attorney before completing or modifying a document.

In a purchased paper AIA Contract Document, necessary modifications may be accomplished by writing or typing the appropriate terms in the blank spaces provided on the document, or by attaching Supplementary Conditions, special conditions or referenced amendments.

Modifications directly to purchased paper AIA Contract Documents may also be achieved by striking out language. However, care must be taken in making these kinds of deletions. Under NO circumstances should standard language be struck out to render it illegible. For example, users should not apply blocking tape, correction fluid or Xs that would completely obscure text. Such practices may raise suspicion of fraudulent concealment, or suggest that the completed and signed document has been tampered with. Both parties should initial handwritten changes.

Using AIA software, modifications to insert information and revise the standard AIA text may be made as the software permits.

By reviewing properly made modifications to a standard AIA Contract Document, parties familiar with that document can quickly understand the essence of the proposed relationship. Commercial exchanges are greatly simplified and expedited, good faith dealing is encouraged, and otherwise latent clauses are exposed for scrutiny.

AIA Contract Documents may not be retyped or electronically scanned. Retyping can introduce typographic errors and cloud legal interpretation given to a standard clause. Furthermore, retyping and electronic scanning are not permitted under the user's limited license for use of the document, constitute the creation of a derivative work and violate the AIA's copyright.

Cover Page

Project. The Project should be identified with the same name, and location or address as set forth in the Owner-Contractor agreement.

Owner. The Owner should be identified using the same legal name and the address as set forth in the Owner-Contractor agreement.

Architect. Similarly, the Architect should be identified using the same legal name and the address as set forth in the Owner-Contractor agreement.

**South Carolina Division of Procurement
Services, Office of the State Engineer Version of
 AIA[®] Document A201[™] – 2007**

General Conditions of the Contract for Construction

This version of AIA Document A201[™]–2007 is modified by the South Carolina Division of Procurement Services, Office of the State Engineer (“SCOSE”). Publication of this version of AIA Document A201–2007 does not imply the American Institute of Architects’ endorsement of any modification by SCOSE. A comparative version of AIA Document A201–2007 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as “AIA Document A201[™]–2007, General Conditions of the Contract for Construction—SCOSE Version,” or “AIA Document A201[™]–2007 — SCOSE Version.”

South Carolina Division of Procurement Services, Office of the State Engineer Version of AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

HGTC - GCAM - Welding Lab Expansion H59-N219-CB
P4003 South Fraser Street, Georgetown, SC 29440

THE OWNER:

(Name, legal status and address)

Horry Georgetown Technical College
P. O. Box 261966
Conway, SC 29528-6066

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE ARCHITECT:

(Name, legal status and address)

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean AIA Document A101™-2007 Standard Form of Agreement Between Owner and Contractor, SCOSE edition. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean AIA Document A201™-2007 General Conditions of the Contract for Construction, SCOSE edition.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 NOTICE TO PROCEED

The 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.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. 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.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 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.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 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 § 8.3 of the Agreement.]

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen (15) 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.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 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.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services; 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.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one electronic copy (.pdf format) of the Contract Documents. The Contractor may make reproductions of the Contract Documents pursuant to Section 1.5.2.

§ 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.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor 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 Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. 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.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from latent errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed by the Owner in writing to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.1.2.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. 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. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor shall comply with the requirements of Title 12, Chapter 8 of the South Carolina Code of Laws, as amended, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or

negotiations concluded. 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.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. 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.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. 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.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent, acceptable to the Owner, and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 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 whether the Owner has reasonable objection to the proposed superintendent. Failure of the Owner to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall notify the Owner, in writing, of any proposed change in the superintendent, including the reason therefore, prior to making such change. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 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 Contractor 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.

§ 3.10.4 The Owner's review and acceptance of the 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.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 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 for review and approval. A copy of the shop drawings will also be sent to OSE for information. 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 for approval.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 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.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 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.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents. 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.

§ 4.2.2 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. However, the Architect will not be required to make exhaustive or

continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 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. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Work completed and correlated with the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 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. The Architect's response to such requests will be made in writing with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, and will not show partiality to either. Except in the case of interpretations resulting in omissions, defects, or errors in the Instruments of Service or perpetuating omissions, defects, or errors in the Instruments of Service, the Architect will not be liable for results of interpretations or decisions rendered in good faith. If either party disputes the Architect's 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.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 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.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 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 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.

§ 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.

§ 5.2.3 If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. If the proposed but rejected Subcontractor was

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reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner makes reasonable objection to such substitution. The Contractor's request for substitution must be made to the Owner in writing accompanied by supporting information.

§ 5.2.5 A Subcontractor identified in the Contractor's Bid in response to 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 in Section 5.2.3.

~~§ 5.2.6 The Iran Divestment Act List is a list published by the State Fiscal Accountability Authority 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.phtml>() 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.~~

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 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 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.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 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.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Reserved.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable

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for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone. 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.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect (using Form SE-380 "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.

§ 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.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 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.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 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;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

§ 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.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. 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.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

§ 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.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 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.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 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.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. All changes to the Contract Sum shall be adjusted in accordance with Section 7.3.3.

§ 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.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 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.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing provided such materials or equipment will be subsequently incorporated in the Work. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site. 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.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated in both the Application for Payment and, if required to be submitted by the Contractor, the accompanying current construction schedule and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, or (3) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect shall withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. 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. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 Pursuant to Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended, the Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 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 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.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use and when all required occupancy permits, if any, have been issued and copies have been delivered to the Owner.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive written list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 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 re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

§ 9.8.3.1 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.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 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 re-inspections 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.

§ 9.10.2 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.

§ 9.10.3 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. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 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.

§ 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.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;

- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 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.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or

who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up. 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.

§ 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.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 In addition to its obligations under Section 3.18, the Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 Reserved.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. 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.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;

- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 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) Damage to Rented Premises (ea occurrence) \$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.

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

- .1 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;
- .2 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
- .3 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, the 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.

§ 11.1.4 A failure by the Owner to either (i) demand a certificate of insurance or written endorsement required by Section 11.1, or (ii) 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.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 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. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 Reserved.

§ 11.3.1.3 Reserved.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 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 be named insureds.

§ 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.

§ 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.

§ 11.3.5 Reserved.

§ 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.

§ 11.3.7 WAIVERS OF SUBROGATION

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. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 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. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 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.

§ 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.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 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 be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

§ 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.

§ 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.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the 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.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2 unless otherwise provided in the Contract Documents.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents. 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.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 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.

§ 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.

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

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Unless expressly provided otherwise, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 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

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 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.

§ 13.7 Reserved

§ 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 Carolina 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)

§ 13.17 OPEN TRADE (JUN 2015)

During the contract term, including any renewals or extensions, Contractor will not engage in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in SC Code Section 11-35-5300. [07-7A053-1]

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 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

§ 14.1.2 The Contractor may terminate the Contract if, 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, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages. Any adjustment to the Contract Sum pursuant to this Section shall be made in accordance with the requirements of Article 7.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 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.

§ 14.2.2 When any of the above reasons exist, the Owner may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 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.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Any adjustment to the Contract Sum made pursuant to this section shall be made in accordance with the requirements of Article 7.3.3. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 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.

§ 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.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and 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.

§ 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 State Fiscal Accountability Authority 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.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. 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. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 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.

§ 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.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. 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.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

- .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.

§ 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).

§ 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).

§ 15.2 Reserved.

§ 15.3 Reserved.

§ 15.4 Reserved.

§ 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.

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:

§ 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, or enter NONE)*

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

§ 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, or enter NONE)*

§ 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, or enter NONE)*

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

§ 16.7 List all attachments that modify these General Conditions. *(If none, enter 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: _____
Address: _____

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: HGTC - GCAM Welding Lab Expansion

State Project Number: H59-N219-CB

Brief Description of Awarded Work: Addition of 10 interior welding booths with gas and exhaust to HGTC Georgetown Center for Advanced Manufacturing Building.

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

Name: ADW Architects

Address: Six Coliseum Centre 2815 - Coliseum Centre Drive, Suite 500
Charlotte, NC 28217

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 be 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 is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.
 - 11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

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: _____
Address: _____

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: HGTC - GCAM Welding Lab Expansion
State Project Number: H59-N219-CB
Brief Description of Awarded Work: Addition of 10 interior welding booths with gas and exhaust to HGTC Georgetown Center for Advanced Manufacturing Building.

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

Name: ADW Architects
Address: Six Coliseum Centre 2815 - Coliseum Centre Drive, Suite 500
Charlotte, NC 28217

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

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

DATED this _____ **day of** _____, **2** _____ **BOND NUMBER** _____
(shall be no earlier than Date of Contract)

CONTRACTOR

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

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the 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 one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.
 5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 5.1 Send an answer to the Claimant, with a copy to the 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 DESIGN-BID-BUILD CONSTRUCTION CONTRACT

AGENCY: Horry-Georgetown Technical College

PROJECT NAME: HGTC - GCAM Welding Lab Expansion

PROJECT NUMBER: H59-N219-CB

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 of Representative: _____

A/E RECOMMENDATION FOR ACCEPTANCE:

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

Print Name or Representative: _____

AGENCY ACCEPTANCE AND CERTIFICATION:

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

Print Name of Representative: _____

Change is within Agency Construction Contract Change Order Certification of: \$ _____ **Yes** **No**

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

SUBMIT THE FOLLOWING TO OSE

1. SE-380, fully completed and signed by the Contractor, A/E and Agency;
2. Detailed back-up information, with OH&P shown, from the Contractor/Subcontractor(s) that justifies the costs and schedule changes shown.
3. If any item exceeds Agency certification, OSE will authorize the SE-380 and return to Agency.

DO NOT INCLUDE THIS PAGE IN THE PROJECT DOCUMENTS

SE-310, Page 2

**INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES -
PROJECT INFORMATION**

ENTIRE FORM MUST BE COMPLETED PRIOR TO ADVERTISING PROJECT FOR BIDS

AGENCY: HGTC - Horry-Georgetown Technical College

PROJECT NAME: HGTC - Expand Welding Booths at GT AMC

PROJECT NUMBER: H59-N219-CB

1. BUDGET

Total Approved Project Funding: \$350,000.00

Construction Budget for this Contract: \$350,000.00 **Estimate of Construction Cost:** \$0.00

(The Final Estimate of Construction Cost cannot be greater than the Agency's Construction Budget for this Project)

2. FLOOD HAZARD *(Provide ALL of the following information for ALL projects, even if not in a flood hazard zone)*

Flood Map Information: **Flood Zone:** X *(A Floodplain Permit is required for A and V Zones)*

Community Number: 450085 **Panel Number:** 0379D

Is the Project Site in a 100-Year Floodplain? Yes No

3. STATUS OF PERMITS AND APPROVALS REQUIRED PRIOR TO BID ADVERTISEMENT

(Copies of all Permits and Approvals MUST be attached prior to advertisement.)

FLOODPLAIN *(OSE approval required, not subject to certification):* N/A

DHEC *(List Individual Permits and/or Approvals):* N/A

Status of Each Permit/Approval:

SCDOT: N/A

Status of Each Permit/Approval:

ZONING *(Include Name of Local Authority):* N/A

Status of Permit/Approval:

OTHER *(List Separately):* _____

Status of Each Permit/Approval:

4. EROSION AND SEDIMENT CONTROL

All Land Disturbing Activity associated with this project shall be performed pursuant to the Contract Documents.

5. GREEN CONSTRUCTION

Is project required to be certified as LEED or Green Globes per the Energy Efficiency Act of 2007? Yes No

If Yes, what certification is being pursued? LEED Silver 2 Green Globes

AGENCY CERTIFICATION

I hereby certify that all of the information on this SE-310 is true and accurate and that the Agency has authorized, unencumbered funds available for obligation to a contract for the project to be advertised.

BY: _____ **TITLE:** _____ **DATE:** _____

Division 01 - General Requirements

SECTION 01 10 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification:
 - 1. Project Location: 4003 South Fraser Street Georgetown, SC 29440
 - 2. Owner: Horry-Georgetown Technical College
- B. Architect Identification: The Contract Documents, date indicated on the Contract Documents, were prepared for Project by ADW Architects Six Coliseum Centre 2815 - Coliseum Centre Drive, Suite 500. Charlotte, North Carolina 28217. Phone: (704) 379-1919.
- C. The addition of 10 new welding booths, and associated welding gas piping and lighting to the welding lab within the Georgetown Center for Advanced Manufacturing Building, and associated mechanical, electrical and plumbing. Also included in the scope is site work required to correct a drainage problem adjacent to the exterior covered work area. _

1.3 CONTRACT[S]

- A. Project will be constructed under **a single prime contract**.

1.4 WORK SEQUENCE

- A. The Work shall be conducted in the following sequences unless construction phases otherwise specified.
 - 1. Construct Work in phases to accommodate the Owner's use; if applicable, of the premises during the construction period; coordinate the construction schedule and operations with the Owner.
 - 2. Construct the Work in phases to provide for public convenience. Do not close off public use of facility until completion of one phase of construction will provide alternative usage.

1.5 SITE INVESTIGATION

- A. The Contractor acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions at the site, the conformation and condition of the ground, the character, quality and quantity of surface and subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the performance of the Work and all other matters which can in any way affect the

GCAM - WELDING LAB EXPANSION
OSE Project #H59-N219-CB
May 16, 2023

Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with all the available information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

1.6 USE OF PREMISES

A. Vacant Site or Unoccupied Building

1. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Partial Owner Occupancy

1. The Contractor shall also permit the Owner to place and install, or to have other Contractors place and install, as much equipment during the progress of the Work as is possible before the final acceptance of the various parts of the Work, and shall coordinate such placing and installation of the equipment, so that it does not in any way whatever interfere with the progress of the Work or any portion of it.

C. Smoking is strictly prohibited on all Horry-Georgetown Technical College campuses

1.7 PROTECTION REQUIREMENTS FOR NEW CONSTRUCTION

A. Protect the existing building from wind, storms, cold, heat, water and dust damage of any sort. Provide all equipment and enclosures to maintain this protection and keep the building interior free of water and dust during the life of the Contract.

B. Provide all shoring and bracing required to maintain the integrity and the safety of the existing structure and for the proper execution of the Work.

C. Exercise the utmost care to protect all existing utility lines from damage during the progress of the Work.

D. Provide and erect before any work begins, and maintain during the progress of the Work, all necessary fences, warning signals, signs and lights. Extent of this work and details of construction shall be in accordance with the requirements of all state and local codes.

E. Any portion of the existing building or existing utility services not included as part of this Contract or any portion of the Work damaged because of failure to provide the protection required shall be removed and replaced with new materials and construction at the Contractor's expense. This work shall be accomplished subject to the Architect's and Owners' approval.

1.8 REPLACEMENT AND REPAIR OF ANY STRUCTURES THAT HAVE BEEN DESTROYED IN THE PROGRESS OF THE WORK:

A. Because of the installation of the new items of equipment, fixtures, materials, etc., that are required by this Project, it may become necessary to remove portions of the existing structure, equipment, and/or utility services. Unless specifically noted otherwise on the Drawings, the Contractor shall be responsible for replacing, in a condition of identical appearance,

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construction, design, working order, and strength as its previous state, any such portion of the existing structure, equipment, and/or utility services so required to be disturbed. The replaced item shall meet the approval of the Architect before final approval of the Project is given.

1.9 WORK UNDER OTHER CONTRACTS

1.10 FUTURE WORK

1.11 PRODUCTS ORDERED IN ADVANCE

1.12 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish some lab equipment etc. during construction; CNC/Machine Tool equipment, Metallurgy tables and equipment, Gas/Liquid Containers and IT/audio visual equipment. The Work includes providing support systems to receive Owner's equipment with plumbing, mechanical and electrical connections.
1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
 2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
 3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
 4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
 5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
 6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
 7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
 8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
 9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
 10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them

1.13 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 49-division format and CSI/CSC's "MasterFormat" numbering system.

PART 2 - PRODUCTS (Not Used)

SUMMARY OF WORK

SECTION 01 10 00

GCAM - WELDING LAB EXPANSION
OSE Project #H59-N219-CB
May 16, 2023

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

GCAM - WELDING LAB EXPANSION
OSE Project #H59-N219-CB
May 16, 2023

SECTION 01 14 00 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
1. Limits: Confine constructions operations only inside the construction area
 2. Owner Occupancy: Allow for Owner occupancy of site
 3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.2 OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 14 00

SECTION 01 25 00 - PRODUCT SUBSTITUTIONS-PRIOR TO BID

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The General Conditions of the Contract for Construction apply to this section

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions prior to the Owner's receipt of bids.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Division 01 Section "Construction Progress Documentation".
- C. Standards: Refer to Division 01 Section "References" for applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under Division 01 Section "Product Requirements".

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, and equipment, of construction required by Contract Documents proposed by the Contractor are considered requests for "substitutions". The following are not considered substitutions:
 - 1. Substitutions that are requested by Bidders beyond the 10 days prior to bid opening submittal period.
 - 2. Revisions to Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution from prime bidders will be considered if received by the architect ten (10) days prior to the bid opening.
 - 1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required below.
 - 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related specification sections and drawing number.

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3. Provide complete documentation on both the product specified and the proposed substitution including the following information as appropriate.
 - a. Comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - b. Samples where applicable or requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the work specified.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
 4. Certification by the Contractor or manufacturer that the substitution proposed is equal-to or better in every respect to that required by the Contract Documents, and that it will perform equal or superior to product specified in the application indicated. The Contractor waives any right to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
 5. Architect's Action: The Architect may request additional information or documentation necessary for evaluation of the request. The Architect will notify the Contractors of acceptance of the proposed substitution by means of an addendum to the bid documents. If the proposed substitute is accepted through an addendum use the product specified by name.
- B. Architect/Engineer's Substitution Approval during bidding and subsequent addendums does not void the Contractor's responsibility to submit the required shop drawings and comply with the other contract documents and requirements.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Contractor's substitution request will be received and considered by the Architect when all of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.

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- B. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an approval or valid request for substitution.

PART 3 - EXECUTION

- A. Submit in format as outlined on following page.

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PRODUCT SUBSTITUTION

Project _____

Date: _____ Bid Opening Date: _____

Product and / or Fabrication Method: _____

Spec Section: _____

Related Drawings: _____

<u>Criteria or Specified Product</u>	<u>Included</u>
Product Data	_____
Fabrication Drawings	_____
Samples Where Applicable	_____
List of changes or Modifications Needed to Work as Noted in Spec	_____

<u>Criteria or Specified Product</u>	<u>Included</u>
Product Data	_____
Fabrication Drawings	_____
Samples Where Applicable	_____
List of changes or Modifications Needed to Work as Noted in Spec	_____

The substitution proposed is equal-to or better in every respect to that required by the Contract Documents, and it will perform equal or superior to product specified in the application indicated. The Contractor waives right to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.

Signed: _____

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. See Division 01 Section "Unit Prices" for administrative requirements for using unit prices.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 20 days receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

5. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on SE-380.

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Submittals Schedule and Application for Payment forms with Continuation Sheets.
 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by

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measured quantity. Use information indicated in the Contract Documents to determine quantities.

8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit a minimum of 3, or number agreed upon at pre-construction meeting, signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

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4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Submittals Schedule (preliminary if not final).
 5. List of Contractor's staff assignments.
 6. Copies of building permits.
 7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 8. Certificates of insurance and insurance policies.
 9. Performance and payment bonds.
 10. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Coordination Drawings.
 - 3. Administrative and supervisory personnel.
 - 4. Project meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 01 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: The Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. The Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Contact Progress Reporting: The scheduling and sequence of all operations shall be carefully coordinated with the Owner and Architect.
- C. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

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1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Indicate relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Refer to Divisions 21, 22 & 23 for specific Coordination Drawing requirements for fire suppression, plumbing and mechanical installations.
 4. Refer to Division 26 for specific Coordination Drawing requirements for electrical installations.

1.5 PROJECT MEETINGS

- A. General Project Meetings: The Architect shall conduct Project coordination/progress meetings on a bi-monthly basis. Project coordination meetings are in addition to specific meetings held for other purposes, such as preinstallation conferences. Schedule and conduct meetings and conferences at Project site, unless otherwise indicated
1. The Contractor shall attend the monthly progress meetings for the purpose of informing the Owner and the Architect regarding the status of the project. Compile minutes of the meeting, and furnish a copy of the minutes to attendants.
 2. Attendees: Owner, Contractor, Job Superintendent, Material Suppliers, and Subcontractors, as appropriate. Each representative shall be thoroughly familiar with the status of the project and shall be prepared to discuss and act upon any situations which may arise. The time, date and location of these meetings will be established during pre-construction conference. The General Contractor shall provide an updated job progress schedule at each meeting and inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 3. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.

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- 2) Sequence of operations.
- 3) Status of submittals.
- 4) Deliveries.
- 5) Off-site fabrication.
- 6) Access.
- 7) Site utilization.
- 8) Temporary facilities and controls.
- 9) Work hours.
- 10) Hazards and risks.
- 11) Progress cleaning.
- 12) Quality and work standards.
- 13) Change Orders

- B. Preconstruction Conference: A preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments. The Architect will compile minutes of the meeting, and will furnish a copy of the minutes to the Contractor and Owner.
1. Attendees: Authorized representatives of Owner, Architect, Engineer's Representative, Contractor and their consultants; The Contractor and its job Superintendent (mandatory), job Foreman (mandatory), major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work. The Contractor shall also provide three (3) local telephone numbers which may be used to contact the Contractor or his authorized representative in the event of an emergency after normal business hours.
 2. Agenda: Discussion of Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, with the Architect and Owner, including channels and procedures for communication. Items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing.
 - c. Designation of responsible personnel.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for processing Applications for Payment.
 - f. Distribution of the Contract Documents.
 - g. Submittal procedures.
 - h. Preparation of Record Documents.
 - i. Use of the premises.
 - j. Responsibility for temporary facilities and controls.
 - k. Parking availability.
 - l. Office, work, and storage areas.
 - m. Equipment deliveries and priorities.
 - n. First aid.
 - o. Security.
 - p. Progress cleaning.
 - q. Working hours.
 3. At the pre-construction meeting, the General Contractor shall submit a schedule of values consisting of a detailed breakdown of the Contract amount showing separate figures for labor and material for each major work item (i.e., tear-off, insulation, membrane, surfacing, metal, asbestos abatement, etc.) The work listed under the various sections

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- and subsections of the Specifications will serve as the format for preparation of the breakdown.
4. The costs employed in making up any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the contract price.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups, if any.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Space and access limitations.
 - q. Regulations of authorities having jurisdiction.
 - r. Testing and inspecting requirements.
 - s. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements.
 4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
- B. Related Sections include the following:
 - 1. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and early finish times.
 - 2. Predecessor activity is an activity that must be completed before a given activity can be started.
- B. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- C. Major Area: A story of construction, a separate building, or a similar significant construction element.
- D. Milestone: A key or critical point in time for reference or measurement.

1.4 SUBMITTALS

- A. Preliminary Construction Schedule: Submit two (2) printed copies; one a single sheet of reproducible media and one a print.

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- B. Contractor's Construction Schedule: Submit two (2) printed copies of initial schedule, one a reproducible print color and one a blue- or black-line print, large enough to show entire schedule for entire construction period.
- C. Field Condition Reports: Submit one (1) copy at time of discovery of differing conditions.
- D. Special Reports: Submit one (1) copy at time of unusual event.

1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CPM CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Conventional Critical Path Method (CPM) Precedence Diagramming Method (PDM) technique shall be utilized to satisfy time applications.
- C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
- D. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Startup and Testing Time: Include not less than ten (10) days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.

- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

2.4 REPORTS

- A. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CPM CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. See Division 01 for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
- C. See Division 01 for submitting test and inspection reports and Delegated-Design Submittals and for erecting mockups.
- D. See Division 01 for submitting warranties Project Record Documents and operation and maintenance manuals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. General: The Architect may, with the concurrence of the Owner, furnish to the Contractor versions of contract drawings in electronic form for Contractor's use in preparing submittals. See Paragraph 1.4 and 1.5 on the Contractor's use of CAD Files
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 01 for list of submittals and time requirements for scheduled performance of related construction activities.
 - 1. The Contractor shall prepare and submit to the Architect, not later than 30 days following the Date of Commencement, and prior to the Contractor's first Application for Payment, a schedule of all Shop Drawings and Submittals as required by the Contract Documents.
 - 2. No Applications for Payment will be reviewed or approved until receipt and approval of the Submittal Schedule.
 - 3. Schedule shall indicate dates for submission.
 - 4. The Architect will schedule his manpower to review submittals based on the time limits established above.
 - a. Submittals by the Contractor received beyond the time limit established above may affect the Architects manpower schedule resulting in additional cost; the

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Contractor shall reimburse the Owner for the costs of the Architect's services for the review or approval beyond the time stipulated above.

- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Initial Review: **Allow 15 work days for initial review of each submittal.** Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. **Allow 15 work days for processing each resubmittal.**
 4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately **4 by 5 inches** on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 2. Transmittal Form: Use AIA Document G810 or CSI Form 12.1A.
 3. If a submittal is delivered to the Architect on digital media such as a CD or DVD, include a transmittal form with the package. If a submittal is sent electronically, include a digital transmittal form with the correspondence.

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- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.
- K. Submittal Review by Architect:
 - 1. The Architect will review each of the Contractor's submittals one initial time, and, should re-submittal be required, one additional time to verify that the reason(s) for re-submittal have been addressed by the Contractor and corrections made.
 - 2. Any review required by the Architect, other than the two (2) indicated above, will be considered additional scope of work for the Architect, and the Contractor shall reimburse the Owner for all costs incurred, including the cost of the Architect's services, made necessary to review such additional re-submittals.

1.4 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files may be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 of the General Conditions shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic means involving computers.
 - 2. The Contractor shall not transfer or reuse Instruments of Service in electronic or machine readable form without the prior consent of the Architect and a signed Electronic Machine Readable Release Form submitted to the Architect.
 - 3. Sub Contractors and Material Suppliers must communicate through the Contractor for the use of Instruments of Service in Electronic Form.
 - 4. **The ADW Electronic Machine Readable Release Form following this Section must be submitted along with subsequent fees associated with the files as noted on the form prior to the Architect providing the files.**
 - 5. **The request, signed release form and fee must be submitted to allow 5 working days for the Architect to perform this service.**

1.5 CONTRACTOR'S USE OF ENGINEER'S AND CONSULTANT'S CAD FILES

- A. **General: The request for the Architect's Engineers and Consultants CAD files shall be at the discretion of the Engineers and Consultants and under the Engineers and Consultants identified conditions.**

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Submit one electronic copy in a digital file format. Digital file submittals must be legible and able to accept digital commenting from industry standard tools such as Adobe Acrobat. Digital file submittals shall not restrict the ability to be printed, the ability to have content copied, or the ability to have pages extracted or added.

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2. The General Contractor will be responsible for printing any hard copies of the submittals otherwise required by the Owner, Building Inspector, Fire Marshall, or other reviewing body.
 3. Partial or incomplete submittals are not acceptable.
 - a. Any submittal or shop drawing received by the Architect, that does not contain all portions required by each Section of the Specification, will be returned not reviewed, not logged and will be considered non-responsive.
 - b. Requests for exceptions must be submitted in writing by the Contractor for evaluation and response, a minimum of 30 days prior to the submittal date indicated on the Contractor's approved/updated Submittal Schedule.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with recognized trade association standards.
 - i. Compliance with recognized testing agency standards.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.
 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
- D. Coordination Drawings: Comply with requirements in Division 01.
- E. Samples: Prepare physical units of materials or products, including the following:

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1. Comply with requirements in Division 01 for mockups.
 2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
Architect will return submittal with options selected.
 3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.
 5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.
- G. Delegated-Design Submittal: Comply with requirements in Division 01.
- H. Submittals Schedule: Comply with requirements in Division 01.
- I. Application for Payment: Comply with requirements in Division 01.
- J. Schedule of Values: Comply with requirements in Division 01.
- K. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A.
- ## 2.2 INFORMATIONAL SUBMITTALS
- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated.
Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 01.

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- B. Contractor's Construction Schedule: Comply with requirements in Division 01.
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."

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- O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.
- R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- S. Construction Photographs: Comply with requirements in Division 1 Section "Construction Progress Documentation."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Reviewed
 - 2. Revise as noted
 - 3. Revise and resubmit
 - 4. Rejected
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

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D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01 33 00

ELECTRONIC MACHINE-READABLE FILE RELEASE

At your request, ADW Architects, p.a. (ADW) will provide the Contractor: _____ with electronic machine readable files for your convenience and use in the preparation of documents subject to the following terms and conditions related to the following project:

Project: _____

ADW utilizes electronic machine-readable files that are compatible with Autodesk and Bentley software. The files furnished, if so requested, will be exported to a .dwg format. ADW makes no representation as to the compatibility of these files with your hardware and/or software. The Contractor shall understand that the automated conversion of information and data from the system and format used by ADW to an alternate system or format cannot be accomplished without the introduction of inaccuracies, anomalies and errors, whether inadvertently or otherwise. In the event project documentation provided in electronic machine-readable format is so converted, the Contractor agrees to assume all risks associated therewith and, to the fullest extent permitted by law, to hold harmless and indemnify ADW from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising therefrom in connection therewith.

Data contained on these electronic machine-readable files is part of ADW's instruments of service and shall not be used by the Contractor or anyone else receiving this data through and from the Contractor for any purpose other than as a convenience in the preparation of documents pertaining to the specific project as indicated on the files furnished. The Contractor recognizes that changes or modifications to ADW's instruments of professional service introduced by anyone other than ADW may result in adverse consequences, which ADW can neither predict nor control. Therefore, and in consideration of ADW's agreement to deliver its instruments of professional service in an electronic machine-readable format, the Contractor agrees, to the fullest extent permitted by law, to hold harmless and indemnify ADW from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising out of or in any way connected with the modification, misinterpretation, misuse, or reuse by others of the electronic machine-readable information and data provided by ADW under this agreement. The foregoing indemnification applies, without limitation, to any use of the project documentation on other projects, for additions, or for completion by others, excepting only such use as may be authorized, in writing, by ADW.

These electronic or machine-readable files are not Contract Documents. Significant differences may exist between these electronic machine-readable files and corresponding hard copy Contract Documents due to addenda, change orders or other revisions. ADW makes no representation regarding the accuracy or completeness of the electronic or machine-readable files you receive. In the event that a conflict arises between the signed Contract Documents prepared by ADW and the electronic machine-readable files, signed Contract Documents shall govern. The Contractor is responsible for determining if any conflict exists. By your use of these files, you are not relieved of your duty to fully comply with the Contract Documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other Contractors.

Under no circumstances shall delivery of the electronic machine-readable files for use by The Contractor be deemed a sale by ADW and ADW makes no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall ADW Architects be liable for any loss of profit or any consequential damages. Usage by any parties of the data contained in the electronic machine-readable files released shall constitute agreement to these terms. However, for record keeping we request that you sign this agreement, copy it for your files and return the original hard copy to us along with requested files and the required payment for this service.

ADW Architects, pa
Six Coliseum Center
2815 Coliseum Center Drive
Suite 500
Charlotte, N.C. 28217

Acknowledged and accepted by:

Company

Authorized Representative

Date

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 2. Review Divisions 02 through 49 sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

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1.5 SUBMITTALS

- A. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- C. Not later than 30 calendar days after the Notice to Proceed date, the contractor shall furnish to the Architect for review a complete list of all subcontractors and all material and equipment to be used in the Project showing the manufacturer, supplier, trade name, and model number of each. Where the specification allows a choice, the list shall indicate the Contractor's choice. This list shall follow the sequence of the sections of the specifications.

1.6 QUALITY ASSURANCE

- A. 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. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- B. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
- C. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- F. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

1.7 QUALITY CONTROL

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- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and reinspect corrected work.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
 2. Notify testing agency and Architect at least 48 hours in advance of time required to perform testing services.

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3. Notify testing agency and Architect at least 72 hours in advance to inspect concrete reinforcing placement prior to pouring concrete or grouting masonry.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

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- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. **Applicability of Standards:** Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. **Publication Dates:** Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. **Conflicting Requirements:** If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-5434
CFR	Code of Federal Regulations Available from Government Printing Office www.access.gpo.gov/nara/cfr	(888) 293-6498 (202) 512-1530
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from National Institute of Building Sciences www.nibs.org	(202) 289-7800

1.4 ABBREVIATIONS AND ACRONYMS

- A. **Industry Organizations:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

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AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
ACI	American Concrete Institute/ACI International www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association www.ahardbd.org	(847) 934-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.e-architect.com	(202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America www.alca.org	(800) 395-2522 (703) 736-9666
ALSC	American Lumber Standard Committee	(301) 972-1700
ANLA	American Nursery & Landscape Association www.anla.org	(202) 789-2900
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(941) 454-6989
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (212) 591-7722
ASTM	American Society for Testing and Materials www.astm.org	(610) 832-9585
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(817) 326-6300

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AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
CCFSS	Center for Cold-Formed Steel Structures www.umn.edu/~ccfss	(573) 341-4471
CDA	Copper Development Association Inc. www.copper.org	(800) 232-3282 (212) 251-7200
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association (Formerly: National Particleboard Association) www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIMA	EIFS Industry Members Association www.eifsfacts.com	(800) 294-3462 (770) 968-7945
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
FMG (FM)	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANNA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association) www.glasswebsite.com/ganna	(785) 271-0208
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LGSI	Light Gage Structural Institute www.loseke.com	(972) 370-0967
LMA	Laminating Materials Association (Formerly: ALA - American Laminators Association) www.lma.org	(201) 664-2700

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MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(312) 201-0193
MFMA	Metal Framing Manufacturers Association	(312) 644-6610
MIA	Marble Institute of America www.marble-institute.com	(614) 228-6194
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NAIMA	North American Insulation Manufacturers Association (The) www.naima.org	(703) 684-0084
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(414) 248-9094
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(303) 697-8441
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-6372
NGA	National Glass Association www.glass.org	(703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NPA	National Particleboard Association (See CPA)	
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSA	National Stone Association www.aggregates.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo and Mosaic Association, Inc. www.ntma.com	(800) 323-9736 (703) 779-1022
NWWDA	National Wood Window and Door Association (See WDMA)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting and Decorating Contractors of America www.pdca.com	(800) 332-7322 (703) 359-0826
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (508) 230-3516
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400

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RMA	Rubber Manufacturers Association www.rma.org	(800) 220-7620 (202) 682-4800
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIGMA	Sealed Insulating Glass Manufacturers Association www.sigmaonline.org/sigma	(312) 644-6610
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPI	The Society of the Plastics Industry www.plasticsindustry.org	(202) 974-5200
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	SPRI (Single Ply Roofing Institute) www.spri.org	(781) 444-0242
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association) www.ssma.com	(312) 456-5590
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(800) 837-8303 (412) 281-2331
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TPI	Truss Plate Institute	(608) 833-5900
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

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BOCA	BOCA International, Inc. www.bocai.org	(708) 799-2300
IAPMO	International Association of Plumbing and Mechanical Officials (The) www.iapmo.org	(909) 595-8449
ICBO	International Conference of Building Officials www.icbo.org	(800) 284-4406 (562) 699-0541
ICC	International Code Council (Formerly: CABO - Council of American Building Officials) www.intlcode.org	(703) 931-4533
SBCCI	Southern Building Code Congress International, Inc. www.sbcci.org	(205) 591-1853

Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-0990
EPA	Environmental Protection Agency www.epa.gov	(202) 260-2090
OSHA	Occupational Safety & Health Administration www.osha.gov	(202) 693-1999
USPS	Postal Service www.usps.com	(202) 268-2000

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 45 29 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 SCOPE:

- A. The Owner will employ and pay for the services of an independent testing laboratory to perform specified testing.
 - 1. Contractor shall cooperate with laboratory to facilitate the execution of its required services.
 - 2. The Contractor shall be fully responsible for seeing that all materials meet the Project requirements. Failure of the Architect or testing laboratory to detect defective work, workmanship, or materials shall in no way prevent rejection and the Contractor taking approved corrective action when such defects are discovered. The Architect shall not be obligated to make final acceptance.

1.02 LABORATORY DUTIES:

- A. Cooperate with Architect and Contractor; provide qualified personnel.
- B. Perform specified inspections, sampling and testing of materials and methods of construction. Comply with specified standards and ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Architect and Contractor of observed irregularities or deficiencies of the Work or products.
 - 1. Promptly submit written report of each test and inspection; one copy each to the Architect, Owner, Contractor, and one copy to Record Documents file. Each report shall, at a minimum, include:
 - a. Date issued.
 - b. Project title and number.
 - c. Testing laboratory name, address and telephone number.
 - d. Name and signature of laboratory inspector.
 - e. Date and time of sampling or inspection.
 - f. Record of temperature and weather conditions.
 - g. Date of test.
 - h. Identification of product and specification section.
 - i. Location of sample or test in the Project.
 - j. Type of inspection or test.
 - k. Results of tests and compliance with Contract Documents.
 - l. Interpretations of test results.
 - 2. Perform additional tests as required by the Architect or the Owner.

1.03 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY:

- A. Laboratory
 - 1. Release, revoke, alter or enlarge on requirements of the Contract Documents.
 - 2. Approve or accept any portion of the Work.
 - 3. Perform any duties of the Contractor.
 - 4. Give instruction to the Contractor's workman in the field. All contact shall be with the Architect (or his representative) and the Contractor's Project Manager.

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1.04 CONTRACTOR'S RESPONSIBILITIES:

- A. Cooperate with laboratory personnel, provide access to Work, to manufacturer's operations.
- B. Secure and deliver to the laboratory, adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the project to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence. The contractor shall reimburse the owner if an inspection fails for a second time, the second test and any subsequent tests shall be paid for by the GC.
- G. The Contractor may for his own convenience, employ and pay for a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing. This shall be done with the understanding that:
 - 1. The additional testing shall be accomplished in accordance with the General Conditions;
 - 2. That the finds of such additional inspections, samplings, and testing shall in no way be binding upon the Owner and the Architect;
 - 3. That any such additional inspections, samplings and testing shall be performed at no additional cost to the Owner.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

NOT APPLICABLE

END OF SECTION 01 45 29

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 01 Section "Alternates" for products selected under an alternate.
 - 2. Division 01 Section "References" for applicable industry standards for products specified.
 - 3. Division 01 Section "Closeout Procedures" for submitting warranties for contract closeout.
 - 4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

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- D. **Manufacturer's Warranty:** Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. **Special Warranty:** Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

- A. **Product List:** Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form:
 - a. Specification Section number and title.
 - b. Proprietary name, model number, and similar designations
 - c. Manufacturer's name and address.
 - d. Supplier's name and address.
 - e. Installer's name and address.
 - f. Identification of items that require early submittal approval for scheduled delivery date.
 - 3. **Completed List:** Within sixty (60) days after date of commencement of the Work, submit three (3) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 4. **Architect's Action:** Architect will respond in writing to Contractor within fifteen (15) days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.
- B. **Substitution Requests:** Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. **Documentation:** Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - f. Cost information, including a proposal of change, if any, in the Contract Sum.
 - g. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - h. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

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2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 5. Store products to allow for inspection and measurement of quantity or counting of units.
 6. Store materials in a manner that will not endanger Project structure.
 7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 9. Protect stored products from damage.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

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product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
 - 3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."
- D. All warranties/guarantees shall become effective on the date of Substantial Completion as established by the Architect. Written warranties/guarantees shall be signed by the manufacturer or subcontractor and countersigned by the Contractor. All warranties/guarantees shall be addressed to the Owner in care of the Architect.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 - 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures: Procedures for product selection include the following:
 - 1. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 - a. Substitutions may be considered, unless otherwise indicated.

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2. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by the manufacturers that complies with requirements.
 - a. Substitutions may be considered, unless otherwise indicated.
3. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" article to obtain approval for use of an unnamed product.
4. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" article to obtain approval for use of an unnamed product.
5. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" article.
6. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product" are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Substitutions may be considered, unless otherwise indicated.
7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.
 - a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.
8. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will NOT consider requests for substitution after the Notice to Proceed. Requests received before Bids are due may be considered or rejected at discretion of Architect.

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- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution must be made in writing directly from the Contractor and not from a subcontractor or material supplier.
 3. Requested substitution does not require extensive revisions to the Contract Documents.
 4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 5. Substitution request is fully documented and properly submitted.
 6. Requested substitution will not adversely affect Contractor's Construction Schedule.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work and that he waives all claims for additional reimbursement related to the substitution which subsequently become apparent.
 9. Requested substitution provides specified warranty.
 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 11. By forwarding a substitution request the Contractor represents that he has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified.

2.3 COMPARABLE PRODUCTS

- A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 4. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 QUALITY ASSURANCE

- 1.4 Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

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1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions. Upon acceptance of surfaces and conditions, any adjustments required for a satisfactory installation shall be made by the Contractor who accepted the Work.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagram-matically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

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- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

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- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

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- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 - 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.

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- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Divisions 02 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 23 and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.

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7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: If extensive cutting and patching is required, before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

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4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 01 73 29

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging non-hazardous demolition and construction waste.
 - 2. Recycling non-hazardous demolition and construction waste.
 - 3. Disposing of non-hazardous demolition and construction waste.
- B. See Division 01 Section "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures and site improvements, and for disposition of hazardous waste.
- C. See Division 31 for disposition of waste resulting from site clearing and removal of above and below grade improvements.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.2 GENERAL WASTE RECYCLING

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 1. Pulverize concrete to maximum 1-1/2-inch size.
- C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- D. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- F. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- G. Lighting Fixtures: Separate lamps by type and protect from breakage.
- H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- I. Conduit: Reduce conduit to straight lengths and store by type and size.

3.4 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

- B. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Burning: Do not burn waste materials.
- D. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. See Division 01 for requirements for Applications for Payment for Substantial and Final Completion.
- C. See Division 01 for submitting Final Completion construction photographs and negatives.
- D. See Divisions 02 through 49 for specific closeout and special cleaning requirements for products of those Sections.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Advise Owner of changeover in heat and other utilities.
 - 11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 12. Complete final cleaning requirements, including touchup painting.
 - 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

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- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 01.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.5 PROJECT RECORD DOCUMENTS (submit 2 hard copies and 2 electronic copies of all record documents)

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

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- B. Record Drawings: Maintain and submit blue- or black-line white prints of Contract Drawings and Shop Drawings.
1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Note related Change Orders and Record Drawings, where applicable.
- D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- 1.6 OPERATION AND MAINTENANCE MANUALS (submit 2 hard copies and 2 electronic copies of all operation and maintenance manuals)
- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.
 2. Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

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- 1.7 WARRANTIES (submit 2 hard copies and 2 electronic copies of all warranties)
- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
 - B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Provide instructors experienced in operation and maintenance procedures.
 - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 - 3. Schedule training with Owner, through Architect, with at least seven days' advance notice.
 - 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline.
 - 1. Include instruction for system design and operational philosophy, review of documentation, operations, adjustments, troubleshooting, maintenance, and repair.

3.2 FINAL CLEANING

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- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom-clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

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- q. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

Division 02 – Existing Conditions

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.3 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

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- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 CLEANING

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

Division 03 – Concrete

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SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
 - 2. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Special concrete finish Subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

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1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Waterstops.
 - 6. Floor and slab treatments.
 - 7. Bonding agents.
 - 8. Adhesives.
 - 9. Vapor retarders.
 - 10. Semirigid joint filler.
 - 11. Joint-filler strips.
 - 12. Repair materials.
- C. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- E. Field quality-control reports.

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- F. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

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- B. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301.
 2. ACI 117.

2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

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2.4 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C 150/C 150M, Type I/II, gray.
 2. Fly Ash: ASTM C 618, Class F or C.
- C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Lightweight Aggregate: ASTM C 330/C 330M, 3/4-inch nominal maximum aggregate size.
- E. Air-Entraining Admixture: ASTM C 260/C 260M.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- G. Water: ASTM C 94/C 94M and potable.

2.5 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A (minimum 10-mils). Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Barrier-Bac; Inteplast Group, Ltd.](#)
 - b. [Fortifiber Building Systems Group.](#)
 - c. [Raven Industries, Inc.](#)
 - d. [Stego Industries, LLC.](#)

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- e. [W. R. Meadows, Inc.](#)

2.6 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

- 1. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:

- a. [BASF Corporation; Construction Systems.](#)
- b. [ChemMasters, Inc.](#)
- c. [Dayton Superior.](#)
- d. [Euclid Chemical Company \(The\); an RPM company.](#)
- e. [Kaufman Products, Inc.](#)
- f. [W. R. Meadows, Inc.](#)

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

- 1. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:

- a. [BASF Corporation; Construction Systems.](#)
- b. [ChemMasters, Inc.](#)
- c. [Dayton Superior.](#)
- d. [Euclid Chemical Company \(The\); an RPM company.](#)
- e. [Sika Corporation.](#)

- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

- D. Water: Potable.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

- B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

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2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Use fly ash and pozzolan as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.

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1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a w/c ratio below 0.50.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 3500 psi at 28 days.
2. Maximum W/C Ratio: 0.50.
3. Minimum Cementitious Materials Content: 520 lb/cu. yd..
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 2. Class B, 1/4 inch for rough-formed finished surfaces.

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- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

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- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. JOINTS
- F. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- G. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- H. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Maximum spacing of joints to be 12'.
 - 2. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 3. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Sawed joints must be performed within 8 hours of slab pour.
- I. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
- J. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.3 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

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- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.4 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

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1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.5 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.

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- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.6 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct concrete bases 6 inches high unless otherwise indicated, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
 - 3. Minimum Compressive Strength: 4000 psi at 28 days.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 - 6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

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3.7 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

3.8 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

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1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

3.9 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

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5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

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2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days and one set of two specimens at 28 days and hold one specimen as reserve for 56-day if required. For 4" diameter specimens, test three specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency

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may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

- E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

3.11 PROTECTION OF LIQUID FLOOR TREATMENTS

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

Division 05 - Metals

SECTION 05 50 00 - METAL FABRICATIONS

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. Miscellaneous framing and supports.
 - 2. Metal edgings.
 - 3. Miscellaneous metal trim.
 - 4. Aluminum Extrusions
 - 5. Aluminum-Alloy Rolled Tread Plate
- B. Related Sections include the following:
 - 1. Division 05 Section "Structural Steel Framing" for structural-steel framing system components.
 - 2. Division 06 Section "General Carpentry" for metal framing anchors and other rough hardware.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Aluminum Extrusions
 - 2. Aluminum-Alloy Rolled Tread Plate
- B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 1. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

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- B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
 2. AWS D1.2, "Structural Welding Code--Aluminum."
 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
 4. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- E. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- F. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

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- G. Slotted Channel Framing: Cold-formed metal channels with flange edges returned toward web and with 9/16-inch wide slotted holes in webs at 2 inches on center.
1. Width of Channels: 1-5/8 inches.
 2. Depth of Channels: As indicated.
 3. Metal and Thickness: Galvanized steel complying with ASTM A 653/ A 653M, structural quality, Grade 33, with G90 coating; 0.108-inch, 0.079-inch or 0.064-inch nominal thickness (as required for load imposed).
 4. Metal and Thickness: Cold rolled steel complying with ASTM A 1008/ A 1008M, Grade 33; 0.0966-inch, 0.0677-inch or 0.0528-inch minimum thickness (as required for load imposed).
 5. Finish: Unfinished where not exposed.
 6. Finish: Rust-inhibitive, baked-on, acrylic enamel finish where exposed to view or to the exterior.
- H. Malleable-Iron Castings: ASTM A 47, Grade 32510.
- I. Gray-Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
- J. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 ALUMINUM

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T6.
- B. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, alloy 6061-T6.
1. Thickness: .025"
 2. Finish: Diamond Plate Embossed

2.4 PAINT

- A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 FASTENERS

- A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

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- C. Anchor Bolts: ASTM F 1554, Grade 36.
- D. Machine Screws: ASME B18.6.3.
- E. Lag Bolts: ASME B18.2.1.
- F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- G. Plain Washers: Round, carbon steel, ASME B18.22.1.
- H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
- I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

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- H. Allow for thermal movement resulting from the maximum change in ambient and surface temperatures (temperature range) by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night-time sky heat loss.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches wide by 1/4 inch thick by 8 inches long at 24 inches on center, unless otherwise indicated.
 - 3. Furnish inserts if units must be installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim where indicated on drawings.

2.9 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

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- B. Finish metal fabrications after assembly.

2.10 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - 1. ASTM A 123, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

2.11 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

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- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

Division 07 - Thermal & Moisture Protection

Division 09 - Finishes

Division 10 - Specialties

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SECTION 11 60 00 WELDING CURTAINS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes welding curtains and hooks

1.2 SUBMITTALS

- A. Product Data: For each curtain
- B. Shop Drawings: Show layouts. Include the following:
 - 1. Location of welding curtains and hooks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified by;
 - 1. Trax Industrial Products
 - 2. Akon Curtain Doors
 - 3. Frommelt Safety Products
 - 4. Or Approved Equal

2.2 WELDING CURTAINS & HOOKS

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. Material: Heavy Duty Tinted Curtains (Transparent)– 40mil thick, 3.95 oz. per square foot
 - 2. Size: 5'-0" Widths x 6'-0" High. Add to this dimension to give you proper drape.
 - 3. Temp Rating: 10 degree F to 140 degree F – Temperature Range
 - 4. Color: (5) Red & (5) Blue
 - 5. NFPA fire retardant, CFM fire retardant
 - 6. Finished edges for clean crisp appearance
 - 7. Triple hems for longevity
 - 8. Provide full loop heavy-duty welding hooks at each welding booth. Coordinate amount with welding Curtain Company.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install curtains and hooks at each welding booth, see drawings for locations.

END OF SECTION 11 60 00

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SECTION 31 00 00**EARTHWORK****PART 1 – GENERAL****1.1 SECTION INCLUDES**

- A. Grading
- B. Excavation
- C. Backfilling
- D. Compaction
- E. Remove and Replace Topsoil
- F. Dressing of Shoulders and Banks
- G. Stone Drainage Filter
- H. Water Control
- I. Testing

1.2 RELATED SECTIONS

- A. Section 01 45 00 – Quality Control
- B. Section 01 45 23 – Testing and Inspecting Services
- C. Section 31 10 00 – Site Clearing

1.3 MEASUREMENT AND PAYMENT

- A. Grading to subgrades, construction of ditches, dressing of disturbed areas, removing and replacing topsoil, excavating, backfilling and compacting to required elevations, testing, staking, and construction supervision shall be included in the contract lump sum price.
- B. Unsuitable Material – Payment shall be included in the contract lump sum price. Payment will include excavation and disposal of unsuitable material.
- C. Borrow – Payment will include furnishing materials required in excess of suitable materials available on site and shall be included in the contract lump sum price.

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- D. Earthwork – All earthwork associated with the installation of bulkheads, headwalls, wingwalls, weir structures, drainage filters, rip-rap, etc. shall not be measured for direct payment. Payment for the earthwork shall be included in the contract lump sum price.
- E. Dewatering – No direct payment shall be made for dewatering. Dewatering shall be included in the contract lump sum price.
- F. Proof Rolling – Payment will include furnishing a loaded truck, truck driver, fuel and rolling the designated areas and shall be included in the contract lump sum price.

1.4 REFERENCES (LATEST REVISION)

- A. ASTM D 448 – Sizes of Aggregate for Road and Bridge Construction.
- B. ASTM D 1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
- C. ASTM D 2487 – Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- D. ASTM D 6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- E. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- F. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

1.5 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures: Procedures for submittals.
- B. Materials Source: Submit gradation analysis, proctor results, and soil classification for all borrow material.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with State of South Carolina standards.

1.7 TESTING

- A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).
- B. In place density tests in accordance with ASTM D 6938.

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- C. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the Engineer.
- D. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any of the tests.
- E. Testing shall be Contractor's responsibility and performed at Contractor's expense by a commercial testing laboratory operating in accordance with subparagraph C above.
- F. Test results shall be furnished to the Engineer prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Borrow shall consist of sand or sand-clay soils capable of being readily shaped and compacted to the required densities, and shall be reasonably free of roots, trash, rock larger than 2 inches, and other deleterious material.
- B. All soils used for structural fills shall have a PI (plastic index) of less than 10, and a LL (liquid limit) of less than 30. Fill soils shall be dried or wetted to appropriate moisture contents prior to compaction. Additionally, fill soils used for the top 2 feet of fill beneath roads and parking lots shall have no more than 15% passing the # 200 sieve. Fill soils used for house lots shall have no more than 25% passing the # 200 sieve.
- C. Contractor shall furnish all borrow material.
- D. Contractor shall be responsible for and bear all expenses in developing borrow sources including securing necessary permits, drying the material, haul roads, clearing, grubbing, excavating the pits, placing, compaction and restoration of pits and haul roads to a condition satisfactory to property owners and in compliance with applicable federal, state, and local laws and regulations.

2.2 SOURCE QUALITY CONTROL

- A. If tests indicate materials do not meet specified requirements, change material and retest.
- B. Provide materials of each type from same source throughout the Work.

PART 3 – EXECUTION

3.1 TOPSOIL

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- A. Contractor shall strip topsoil and stockpile on site at a location determined by the Owner at the Contractor's expense.
- B. Topsoil shall be placed to a depth of 4 inches over all disturbed or proposed landscaped areas.
- C. Topsoil shall be provided at Contractor's expense if it is not available from site.
- D. Any remaining topsoil will be hauled off site at the Contractor's expense.
- E. Do not excavate wet topsoil.

3.2 EXCAVATION

- A. Suitable excavation material shall be transported to and placed in fill areas within limits of the work.
- B. Unsuitable material encountered in areas to be paved and under building pads, shall be excavated 2 feet below final grade and replaced with suitable material from site or borrow excavations. Contractor shall notify Engineer if more than 2 feet of excavation is needed to replace unsuitable material.
- C. Unsuitable and surplus excavation material not required for fill shall be disposed of off site.
- D. Proper drainage, including sediment and erosion control, shall be maintained at all times. Methods shall be in accordance with the National Pollutant Discharge Elimination System standards and other local, state, and federal regulations.
- E. Unsuitable materials as stated herein are defined as highly plastic clay soils, of the CH and MH designation, border line soils of the SC-CH description, and organic soils of the OL and OH description based on the Unified Soils Classification System. Further, any soils for the top two feet of pavement subbase shall have no more than 15% passing the # 200 sieve.

3.3 GROUND SURFACE PREPARATION FOR FILL

- A. All vegetation, roots, brush, heavy sods, heavy growth of grass, decayed vegetable matter, rubbish, and other unsuitable material within the areas to be filled shall be stripped and removed prior to beginning the fill operation.
- B. Sloped ground surfaces steeper than 1 vertical to 4 horizontal, on which fill is to be placed shall be plowed, stepped, or benched, or broken up as directed, in such a manner where fill material will bond with the existing surface.

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- C. Surfaces on which fill is to be placed and compacted shall be wetted or dried as may be required to obtain the specified compaction.

3.4 FILL

- A. Shall be placed in successive horizontal layers 8 inches to 12 inches in loose depth for the full width of the cross-section and compacted as required.

3.5 FINISHED GRADING

- A. All areas covered by the project including excavated and filled sections and adjacent transition areas shall be smooth graded and free from irregular surface changes.
- B. Degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, supplemented with hand raking and finishing, except as otherwise specified.
- C. Unpaved areas to within 0.1 feet of elevations shown on the drawings provided such deviation does not create low spots that do not drain.
- D. Paved Areas – Subgrade to within 0.05 feet of the drawing elevations less the compacted thickness of the base and paving.
- E. Ditches and lagoon banks shall be finished graded, dressed, and seeded within 14 calendar days of work to reduce erosion and permit adequate drainage.

3.6 DISPOSAL OF WASTE MATERIAL

- A. All vegetation, roots, brush, sod, broken pavements, curb and gutter, rubbish, and other unsuitable or surplus material stripped or removed from limits of construction shall be disposed of by the Contractor.

3.7 PROTECTION

- A. Graded areas shall be protected from traffic, erosion, settlement, or any washing away occurring from any cause prior to acceptance.
- B. Contractor shall be responsible for protection of below grade utilities shown on the drawings or indicated by the Owner at all times during earthwork operations.
- C. Repair or re-establishment of graded areas prior to final acceptance shall be at the Contractors expense.
- D. Site drainage shall be provided and maintained by Contractor during construction until final acceptance of the project. Drainage may be by supplemental ditching, or pumping if necessary, prior to completion of permanent site drainage.

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3.8 DRAINAGE

- A. Contractor shall be responsible for providing surface drainage away from all construction areas. This shall include maintenance of any existing ditches or those constructed in the immediate vicinity of the work. Contractor shall provide proper and effective measures to prevent siltation of wetlands, streams, and ditches on both the Owner's property, and those properties downstream.

3.9 FIELD QUALITY CONTROL

- A. Compaction testing shall be performed in accordance with ASTM D 6938. Where tests indicate the backfill does not meet specified requirements, the backfill shall be reworked or removed and replaced, and then retested at the Contractor's expense.
- B. Unpaved areas – at least 90% of maximum laboratory density within 2% optimum moisture content unless otherwise approved by the Engineer.
- C. Paved Areas and Under Structures – top 6 inch layer of subbase to at least 98% of maximum laboratory density within 2% optimum moisture content. Layers below top 6 inches shall be compacted to 95% of maximum laboratory density within 2% optimum moisture content.
- D. Rolling and compaction equipment and methods shall be subject to acceptance by the Engineer. Acceptance in no way relieves Contractor of the responsibility to perform in correct and timely means.
- E. Number of Tests – Under paved areas, no less than one density test per horizontal layer per 5,000 square feet of subbase shall be made. In unpaved areas, no less than one density test per horizontal layer per 10,000 square feet of fill area shall be made. Under curb and gutter, no less than one density test per every 300 linear feet.

3.10 PROOF ROLLING

- A. Shall be required on the subbase of all curb and gutter and paved areas and on the base of all paved areas where designated by the Engineer. Proof rolling shall take place after all underground utilities are installed and backfilled. The operation shall consist of rolling the subbase or base with a fully loaded 10-wheeled dump truck. A full load shall consist of 10 to 12 cubic yards of soil or rock. The dump truck shall be capable of traveling at a speed of two to five miles per hour and be in sound mechanical shape with no exhaust leaks or smoking from burning oil. The Engineer shall determine number of passes and areas rolled.

END OF SECTION

SECTION 22 01 00-GENERAL PROVISIONS - PLUMBING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. The work to be done under Division 22 contract shall include the furnishing of all labor, materials, equipment, and services necessary for and reasonably incidental to the proper completion of all work as shown on the plans and herein specified, excepting only work materials specified or noted as being furnished or installed by others.
- B. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotation.
- C. The Plumbing contractor may hereinafter also be referred to as "This contractor," "PC", or Division 22 contractor.
- D. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule or architectural drawings for material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.

1.2 WORK INCLUDED:

- A. The plumbing contractor shall be responsible for including the cost of all labor, accessories, tools, equipment and materials required to completely execute installation of the entire plumbing systems as shown on the drawings and as specified. Work under the plumbing contract shall include, but shall not be limited to, the furnishing, unloading, handling, distribution, setting and installation of all components required for the following systems:
 - 1. Water service (interior and exterior to a point 5'-0" outside the building).
 - 2. Sanitary sewers (interior and exterior to a point 5'-0" outside the building).
 - 3. Laboratory gas piping systems
 - 4. Hot and cold domestic water systems.
 - 5. Piping Specialties.
 - 6. Insulation on plumbing systems.
 - 7. Storm sewer (interior and exterior to a point 5'-0" outside the building).
 - 8. Plumbing fixtures.
 - 9. Rough-in and final connections.
 - 10. Miscellaneous items as specified, required and/or shown on drawings.
 - 11. All vents, safety valves, vacuum breakers, drain and piping systems as required.
 - 12. Natural gas piping.

1.3 RELATED WORK WHICH IS A PART OF SECTION 22 01 00:

- A. All work done under this section of the specification is subject to the Architect's instructions to bidders, general conditions and their corresponding supplements.

- B. Refer to the supplementary general conditions of these specifications for temporary services and facilities that shall be provided.

1.4 DEFINITIONS:

- A. "Piping": Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents, and items customarily required in connection with the transfer of fluids.
- B. "Ductwork": All air delivery, recirculation and exhaust ducts, whether of sheet metal or other material, and includes all connections, accessories, and appurtenances necessary for and incidental to a complete system.
- C. "Provide" (P): Furnish and install complete ready for use.
- D. "Furnish" (F): Purchase and deliver to the project site complete with every necessary appurtenance and support.
- E. "Install"(I): Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation of the proper location in the project.
- F. "Concealed": Embedded in masonry or other construction, installed behind wall furring, within double partitions of hung ceilings, in crawl spaces, in shafts.
- G. "By Other Trades": Shall mean by persons or parties who are not anticipated to be the Plumbing Contractor this trade working together with the general contractor. In this context the words "by other trades" shall not be interpreted to mean not included in the overall contract.

1.5 ABBREVIATIONS:

- | | | |
|----|--------|-------------------------------------|
| A. | AD | Access Door |
| B. | AFF | Above Finish Floor |
| C. | AMP | Amperes |
| D. | AP | Access Panel |
| E. | AV | Air Vent |
| F. | BWV | Back Water Valve |
| G. | BO | By Others |
| H. | C | Conduit |
| I. | CAB | Cabinet |
| J. | CB | Catch Basin |
| K. | CI | Cast Iron |
| L. | CL | Ceiling |
| M. | CO | Clean Out (F-Floor)(W-Wall)(Y-Yard) |
| N. | CONTR | Contractor |
| O. | CP | Circulating Pump |
| P. | DB | Decibels |
| Q. | DIS.SW | Disconnect Switch |
| R. | DN | Down |
| S. | ELEC | Electrical |
| T. | FD | Floor Drain |
| U. | FL | Floor |
| V. | HB | Hose Bibb |
| W. | I | Install |

X.	IE	Invert Elevation
Y.	MH	Manhole
Z.	NC	Noise Criteria
AA.	P	Provided (Furnished & Installed)
BB.	PLBG	Plumbing
CC.	UF	Underfloor
DD.	UG	Underground
EE.	VCP	Vitrified Clay Tile Pipe
FF.	WC	Water Closet
GG.	Ø or PH	Current Phase

1.6 INTERPRETATION OF CONTRACT DOCUMENTS:

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complementary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to a specific element of work, take precedence over the specifications where they may conflict.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted.
- D. The drawings of necessity utilize symbols as schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.
- G. Information as to the general construction shall be derived from structural and architectural drawings and specification only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.7 DELINEATION OF WORK:

A. The plumbing contractor is required to supply all necessary supervision and coordination of information to any others who are performing work to accommodate plumbing installations. Where the plumbing contractor is required to install items which he does not purchase, he shall include for such items:

1. The coordination of their delivery.
2. Their unloading from delivery trucks driven in to any designated point on the property line.
3. Their safe handling and field storage up to the time of permanent placement in the project.
4. The correction of any damage, defacement or corrosion to which they may have been subjected.
5. Their field assembly and internal connections as may be necessary for their proper operation.
6. Their mounting in place including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt them to architectural and structural conditions.
7. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.

B. Items which are to be installed but not purchased as part of the work of the plumbing contractor shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The work under this contract shall include all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

C. The specifications for the overall construction delineate various items of work under separate section headings. The list below set forth this delineation to the extent that it affects the plumbing work category. In the absence of more detailed information, this list shall be taken as a specific instruction to the plumbing contractor to include the work assigned to him. Indications that each contractor is to perform the work means that it is to perform the work for its own accommodation only, except as specifically noted otherwise.

1. "P" indicates Provide
2. "F" indicates Furnish
3. "I" indicates Install

<u>Item</u>	<u>“General”</u>	<u>“Plbg”</u>	<u>“HVAC”</u>
Motors for plumbing equipment	_____	P _____	_____
Motor controls for plumbing equipment	Refer to motor control schedules.		
Power wiring for plumbing equipment	Refer to Section 22 01 04		

<u>Item</u>	<u>“General”</u>	<u>“Plbg”</u>	<u>“HVAC”</u>
<u>EXCEPTION:</u> Refer to notes on drawings.			
Hoisting	_____	P _____	_____
Rigging	_____	P _____	_____
Cutting and Patching	_____	P _____	_____
<u>EXCEPTION:</u> Cost where due to late installation or improper coordination of work is the responsibility of the delinquent contractor. Locations shall be approved by structural engineer.			
Framed slots and openings in walls, decks and slabs	_____	P _____	_____
<u>EXCEPTION:</u> Coordination drawings are required from plumbing contractor.			
Sleeves through non-membraned slabs, decks and walls	_____	P _____	_____
<u>EXCEPTION:</u> Refer to Division 03 00 00 for coordination of installation.			
Removal of and repaving of existing sidewalks, roads, etc. resulting from modification and new mech. utilities	P _____	_____	_____
<u>EXCEPTION:</u> Refer to Division 31 00 00 for additional requirements.			
Sleeves through membraned slabs, decks and walls	_____	P _____	_____
<u>EXCEPTION:</u> Refer to Division 03 00 00 for coordination of installation.			
Fireproof sealing of excess opening in slabs, decks and fire rate walls	_____	P _____	_____
Excavation and backfill of trenches inside building	_____	P _____	_____
<u>EXCEPTION:</u> Specifications and drawings delineate exceptions.			
Blasting	_____	P _____	_____
<u>EXCEPTION:</u> Only with permission of Architect.			
Keeping trench excavations free from water during construction	_____	P _____	_____
<u>EXCEPTION:</u> The general contractor shall be responsible for keeping the entire site free from surface water.			
Fastenings	_____	P _____	_____

<u>Item</u>	<u>“General”</u>	<u>“Plbg”</u>	<u>“HVAC”</u>
Supports	_____	P _____	_____
Concrete foundations, pads and bases inside buildings	_____	P _____	_____
Field touch-up painting damaged shop coats	_____	P _____	_____
Finish painting of exposed work	_____	P _____	_____

EXCEPTION: Painting of equipment, piping etc. in mechanical spaces provided by plumbing contractor. The plumbing contractor shall prime all exposed piping, etc. in finished spaces.

Finished wall and ceiling access doors, panels & support frames	I _____	F _____	_____
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EXCEPTION: Plumbing contractor shall supply and locate all required access doors to the installing trade.

Domestic make-up water piping for heating and air conditioning system	_____	P _____	_____
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EXCEPTION: Final connection provided by HVAC contractor.

Removal of spray on fire proofing from plumbing equipment, hangers, etc.	P _____	_____	_____
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Rubbish Removal	_____	P _____	_____
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EXCEPTION: Where one trade furnishes and another installs, the installing trade shall remove the shipping and packing material which accumulate.

Special tools for equipment maintenance	_____	P _____	_____
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Piping and associated work outside of the building line	_____	P _____	_____
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EXCEPTION: Rough-in and final connection shall be provided by the plumbing contractor providing specified services.

- D. This plumbing contractor is required to supply all necessary supervision and coordination of information to any others who are supplying work to accommodate his installation.

1.8 STANDARDS AND CODES:

- A. Nothing in this specification shall be interpreted to conflict with any City or State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction."
- C. All equipment with electrical components shall bear the UL label.
- D. The following minimum standards apply wherever applicable:
 - 1. ANS American National Standards
 - 2. ASTM American Society for Testing Materials
 - 3. NEMA National Electrical Manufacturers Association
 - 4. NFPA National Fire Protection Association
 - 5. OSHA Occupational Safety and Health Act
 - 6. AGA American Gas Association
 - 7. ASA American Standards Association
 - 8. AWWA American Water Works Association
 - 9. CISPI Cast Iron Soil Pipe Institute
 - 10. NBFU National Board of Fire Underwriters
 - 11. PDI Plumbing and Drainage Institute

1.9 INSPECTION AND COOPERATION:

- A. All work shall be done under the periodic observation of and to the complete satisfaction of the Architect. No deviations from the Drawings and Specifications will be allowed without prior written approval of the Architect. The plumbing contractor shall cooperate with the other contractors to allow for the installation of their work as well as his own.
- B. The plumbing contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this contractor without regard for other work, or if a conflict results, must be changed if directed by the Architect or Engineer without additional cost to Owner or his agents.
- C. Relocation of equipment, piping, system connections or rough-in locations up to ten feet (10') in any direction, if necessary, shall be done at no additional cost to the Owner or his agents upon notification, or as determined by the preparation of fabrication or coordinated shop drawings, prior to installation.
- D. All concealed work shall be inspected by the Architect or his appointed representative before being concealed. Plumbing Contractor shall call for inspection at least two (2) work days before concealment.
- E. The Architect shall have the right to inspect the work whenever advisable in his judgment. The plumbing contractor shall have a representative present at each inspection and shall give such assistance as may be required.

- F. Recommendations made by the Architect shall be promptly carried out and all unsatisfactory material and workmanship replaced at once to the Architect's satisfaction at the contractor's expense.
- G. The plumbing contractor shall be responsible for hoisting of all materials and equipment furnished under as part of his portion of the work in accordance with all State, and Federal rules and regulations.

1.10 TEMPORARY SERVICES AND FACILITIES:

- A. Refer to general requirements for temporary services and facilities that shall be provided.

1.11 UNIT PRICES:

- A. Refer to general requirements relative to "Add" or "Deduct" prices relative to this contract.

1.12 ROCK DEFINITION:

- A. Refer to Division 31 for definitions and requirements relative to rock encountered during excavation.

1.13 SUBMITTALS:

- A. LIST OF MANUFACTURERS: Within twenty days following award of contract, the plumbing contractor shall submit the required information pertaining to the equipment and materials he will be furnishing, commencing with the list of manufacturers for approval by the engineer. Following up in short order shall be the shop drawings and other documents. The Owner and his representatives reserve the right to reject as unacceptable any items for which, in their judgment, they have not been allowed adequate lead time in which to investigate suitability, or their experience has proved the service or equipment unsatisfactory.

Section	Item	Manufacturers		
220204	Motors	Westinghouse	Wagner	Gould Century
220208	Identification	Seton	Calpico	SSC
220510	Pipe	Republic Steel	National Tube	Youngstown
220510	Fittings	Tube-Turn	Grinnell	Ladish
220510	Vacuum Breakers	Bidero	Watts	Wilkins
220510	Pipe Thread Compound	Crane	Dixon	Rutland
220512	Sleeves	Pipe Shields	R&S Mfg	Clow
220512	Hangers	Modern	F&S	Grinnell
220512	Escutcheon	U.S. Brass	Brass Craft	Central Brass
220512	Fire Sealant	ChaseFoam	3M	Proset

Section	Item	Manufacturers		
220512	Access Doors	Milcor	Acorn	Sioux Chief
220512	Pipe Supplies	F&S	F&M	Grinnell
220512	Hot Water Expansion Tank	Wessels	Amtrol	B&G
220512	Reduced Pressure Backflow Preventer	Wilkins	Watts	Febco
220512	Thermostatic Mixing Valve	Lawler	Powers	Leonard
220523	Valves	Apollo	Jenkins	Fairbanks
220523	Circuit Setters	B&G	Taco	Thrush
220523	Butterfly Valves	Apollo	Monarch	Dover
220523	Silent Check Valves	Apollo	Watts	Ames
220523	Gravity Flow Check Valves	B & G	Taco	Armstrong
220548	Seismic Restraints	Mason	Grinnell	Uni-Strut
220700	Insulation	Certainteed	Owens-Corning	Knauff
220700	Insulation Mastic	Benjamin & Foster	Armstrong	3M
221301	Thermometers	Weksler	Palmer	Trerice
221301	Pressure Gauges	Ashcroft	Palmer	Trerice
222113	Specialties	B&G	Taco	Armstrong
222113	Unions	Grinnell	Watts	Wilkins
222113	Safety Valves	Lonegran	Kunkle	Crane
222113	Strainers	Watts	Febco	Hammond
223300	Domestic Water Heater	Rheem	Lochinar	A.O Smith
224000	Plumbing Fixtures	Toto	Kohler	American Standard
224000	Plumbing Trim	Delta	Kohler	T & S Brass
224000	Flush Valves	Toto	Sloan Royal Co.	Zurn
224000	Fixture Seats	Bemis Mfg. Co.	Kohler	Olsonite
224000	Water Coolers	Elkay	Haws	Sunroc Corp.
224000	Stainless Steel Sinks	Elkay Mfg.	Just Mfg.	Kohler
224000	Fixture Carriers	Josam Mfg.	Zurn	Wade

1.14 SHOP DRAWINGS:

- A. Prior to purchasing any equipment or materials, the approved list of the manufacturers shall be returned by the Engineer to the plumbing contractor.
- B. Shop drawings shall be submitted conforming to the requirements stated in supplementary conditions and Division 01 for the items indicated throughout the following specifications:
- C. Documents will not be accepted for approval unless:
 - 1. They comply with the requirements of the supplement to the General Conditions.
 - 2. They include complete information pertaining to appurtenances and accessories.
 - 3. They are submitted as a package where they pertain to related items.
 - 4. They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not applicable, and are marked with pertinent specification paragraph number.
 - 5. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.
 - 6. The submittal is stamped approved by the Plumbing contractor and contain no other markings.
 - 7. Approval of shop drawings does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

1.15 FABRICATION DRAWINGS:

- A. Prior to assembling or installing the work, the following shall be submitted to the Architect by the plumbing contractor:
 - 1. Scaled drawings indicating insert and sleeve locations. The background shall include the structural framing plan.
 - 2. Scaled drawings (1/4" or larger) showing dimensional locations in plan and elevation of all piping, conduit, sprinkler systems, ductwork, lighting fixtures, structure, and equipment. Supervisor or foreman of the Plumbing, Mechanical and Electrical installing trade shall review drawings for coordination and initial each (as a sign of approval) drawing he reviews.
 - 3. Scaled drawings (1/4" or larger) showing dimensional locations in plan and elevation of all piping, ductwork and equipment in equipment rooms.
- B. The following general rules shall apply to the proceeding items:
 - 1. The sprinkler piping will generally be run dead level, without pockets, so the piping system is drainable. The plumbing contractor shall be furnished copies of and a "CADD disk" of the Fire Protection shop drawings from his subcontractor for use in preparing the coordinated duct drawings.

2. Storm drain piping and sanitary waste piping, in which the grade must be maintained, shall have first priority. Ducts and other pipes shall be offset to avoid them.
3. Service piping (water, gas, air, ultrapure water, etc.) shall generally be run below ductwork so they will be accessible for service and modifications. The pipes will be offset as required to avoid interfering with access to duct access to duct access panels, dampers, etc.
4. Ducts will have next priority. Ducts will be offset as required to avoid pipes.
5. Where pipes of different trades conflict, such as domestic water vs. chilled water, the smaller pipe shall be offset.
6. Plumbing Contractor shall make field water, waste and vent riser isometrics as required to comply with local code interpretations as herein stated or as required by local authorities having jurisdiction if not compatible with bid documents.

PART 2 - GENERAL

2.1 GENERAL

- A. All materials used in this work shall be new unless otherwise noted. All materials used on this project shall be listed and labeled by one of the third party agencies which have been approved by the U.L. building authority housing jurisdiction to safety test and label electrical and mechanical equipment. Any material installed that is not labeled shall be subject to a field evaluation by one of these approved agencies, at the contractor's expense, if requested by the authority having jurisdiction or the engineer. Any item not approved by the agency shall be replaced by the contractor at his expense. It shall be the contractor's responsibility to verify that materials specified or used on the project are labeled.

2.2 MATERIALS AND MANUFACTURERS:

- A. All equipment and materials required for installation under these specifications shall be new manufactured and without blemish or defect. All equipment shall bear labels attesting to Underwriter Laboratories approval where subject to Underwriters Laboratory label service. Where no specific indication as to the type of material or equipment is indicated a first class standard article shall be furnished.
- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible. It is the intent of the specifications that wherever manufacturers of a product are specified any substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction such as lesser heat exchange surface, etc.). Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance. In many cases equipment is oversized to allow for pick-up loads which cannot be delineated under the minimum performance.
- C. Substituted equipment where permitted or approved, must conform to space requirements, whether approved or not or shall be replaced at the plumbing

contractor's expense. Any modification of related systems as a result of substitutions shall be made at the plumbing contractor's expense.

- D. Note the approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not assure that the Engineer, Architect, or any other Owner's Representative, attests to the dimensional accuracy or the ability of the material or equipment involved or the mechanical performance of the equipment.

2.3 SUBSTITUTION OF SPECIFIED MATERIALS:

- A. It is the purpose of this specification not to exclude competition between manufacturers of similar equipment.
- B. Where items are specified as "or approved equivalent" prior approval must be obtained from the Engineer. Said approval does not intend to obligate the Engineer in the event shop drawings submitted do not indicate equality of materials, workmanship or function and the right to reject substitutes shall remain the prerogative of the Engineer.
- C. In all cases regardless of method of submission, the plumbing contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed. Minor modifications to suit standard manufactured items are acceptable if approved by Engineer.
- D. Should contract documents fail to describe particular materials or goods to be used, then it shall be the duty of plumbing contractor to inquire of Engineer as to what is to be used and to supply it at plumbing contractor's expense.
- E. Plumbing Contractor shall promptly remove, at own expense, rejected materials from site of work.
- F. When material has been approved, no change in brand or make will be permitted without approval of Engineer.

2.4 NAMEPLATES:

- A. All items of operation equipment used on the project shall be provided with a nameplate mounted in a conspicuous place on the unit. Plate shall be embossed metal or stamped metal securely fastened to the unit.
- B. The plate shall contain the following information:
 - 1. Manufacturer's name and address.
 - 2. All approval stamps, AGA, UL, Etc. as hereinafter specified.
 - 3. Complete capacity and operating data as approved by Engineer
 - 4. Motor Characteristics
 - 5. Serial number and code numbers
 - 6. Date of manufacturer

2.5 RECORD DRAWINGS:

- A. Purchase and maintain at the job site a complete and separate set of prints of the approved working Drawings on which to accurately indicate daily progress by coloring materials and apparatus as installed. Schedules shall be modified to reflect data consistent with that of the installed equipment. Clearly show all changes to the work as a result of change orders, instruction issued by the Architect or conditions encountered in the field. Accurately indicate the location, size, type and elevation of new utilities and their relationship to existing utilities.
- B. The marked-up and colored-in prints will be used as a guide for determining the progress of the work installed. They shall be inspected at the architect's discretion and shall be corrected immediately if found inaccurate or incomplete. Requisitions for payment may not be approved until the drawings are accurate and up-to-date.
- C. The plumbing contractor shall provide one set of marked plans to the Engineer for his review and approval of record drawings. The approved plans shall be returned to the contractor for his CADD preparation of documents using version 12 to indicate correct location of all equipment, piping, etc. as installed on project.
- D. The drawings shall provide an accurate and complete record of the work as installed.

PART 3 - EXECUTION

3.1 WORKMANSHIP:

- A. Workmanship shall be of best quality. Good appearance of finished work shall be of equal importance with its mechanical efficiency. No make-shifts shall be permitted anywhere in work and all portions of work shall be so laid out and installed that work as a whole is of uniform quality and appearance.

3.2 PROTECTION OF EQUIPMENT:

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping.
- D. The plumbing contractor shall be responsible for the work damaged by him in executing this contract. Any work damaged by the plumbing contractor shall be replaced by him and placed in perfect condition without extra cost.

3.3 CONTIGUOUS WORK:

- A. If any part of the plumbing contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, the contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should plumbing contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible.

3.4 CERTIFICATES OF INSPECTION AND APPROVAL:

- A. Upon completion of work, plumbing contractor shall furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.5 SLEEVES AND OPENINGS:

- A. All sleeves and openings required shall be located and provided by the plumbing contractor for his portion of the work. Core drilling for missed sleeves shall be provided by the delinquent contractor.
- B. In order to minimize liquid leakage or transfer of air between floors, it is the intent that pipe penetrations of floors (except in plumbing chases) be held to a minimum. Where it is necessary to penetrate floors, the pipe shall pass through sleeves set in the concrete, and the space between the pipe and sleeve shall be caulked to make it air tight.

3.6 ACCESS TO EQUIPMENT AND VALVES:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.
- C. Where devices are to be concealed in walls or above nonremovable ceilings, the plumbing contractor shall furnish the required access panels to the GC for installation for their respective equipment.
- D. Size of panels shall be 12" x 12" square for all wall panels and 24" x 24" for ceiling panels.

3.7 COORDINATION:

- A. The plumbing contractor is cautioned that portions of the building have an unusually high quantity of piping, ducts, conduits, and other mechanical equipment, and space is limited. The contractor shall offset pipes as required to avoid interference at no additional cost to the Owner. Generally pipes in which grade must be maintained, such as waste and storm drain piping, and sprinkler piping, shall have first priority. Other pipes shall be offset as required to avoid those items. The HVAC contractor

will be required to prepare coordinated shop drawings of the ductwork. The Plumbing Contractor will be furnished copies of these drawings and shall use them for his coordination drawing efforts and in determining pipe routing.

- B. The HVAC contractor will make the basic duct drawings and send sepias to the plumbing contractor. Within 30 days after receiving the sepias and “CADD disk”, the plumbing contractor shall return them to the mechanical subcontractor, marked to show how plumbing pipes cross the ducts, and with suggested pipe elevation for each pipe. The HVAC contractor will use this information plus similar information received from other contractors to prepare the finished coordination drawings.
- C. The HVAC contractor shall provide manufacturers installation drawings as shipped with equipment, field working and location drawings, coordination drawings, wiring diagrams as required to show information required for information and coordination of the work for other trades. This includes locations of equipment, sleeves, foundations, curbs, pipe connections, wiring connections, etc. These drawings shall be provided in advance of work in the area so that the necessary coordination can be done at the proper time. The drawings shall be submitted to the A/E for record only and other subcontractors involved in the work.
- D. The HVAC contractor shall coordinate the work of his trade and other trades in order that interference between plumbing, mechanical, electrical, architectural and structural work will be avoided. Piping, ducts, conduits, etc. shall be kept as close as possible to ceiling, walls, columns, etc. in order to take up the minimum amount of space; and all offsets, fittings, etc. required shall be furnished without additional cost to the Owner. In case interferences develop, the Engineer will decide which equipment shall be relocated regardless of which was first installed.
- E. Minor changes required by Owner, and any incidental changes required to meet structural conditions or to match trim etc. shall be made by this contractor without extra cost to the Owner. Generally, all pipes, and conduits except those in the equipment room and in other locations specifically designated on the plans shall be run concealed in furrings and chases. In the event that it is necessary to expose these items in finished areas, this shall be called to the Architect's attention before proceeding with the work.
- F. The plumbing contractor shall cooperate closely with the General Contractor and all other contractors on the job in order that the job will progress smoothly to its completion. He shall lay out his pipe in advance of pouring floors, or installing walls, shall provide to the General Contractor the location and size of any openings he may require, and shall furnish for the installation by the General Contractor any sleeves, forms, inserts, or hangers required for his work. In the event of failure to do these things at the proper time, or improper location of the required items, the cutting and patching required to rectify the errors shall be done by the plumbing contractor who installed the original material being cut but shall be paid by the contractor at fault, as determined by the Engineer, at no additional cost to the Owner.
- G. All equipment shall be installed with sufficient access and clearance for maintenance, repairs, and replacement. In the event that it appears necessary to install equipment without proper access or clearance, the work shall be stopped until written permission is received from the Engineer to install the equipment. Pipes shall be installed in such a way as to allow maximum headroom where pipes are in

occupied areas. Valves shall be located in such a position that they are easily accessible and so that the valve wheels can be easily turned to full open or full closed positions.

3.8 CHASES, CUTTING AND PATCHING:

- A. In new construction, chases in walls for any work to be installed by the plumbing contractor will be provided by the general contractor provided full information as to the location and size of such chases and the necessary frames for openings is given to him by this contractor in such time as to cause no delay in the general contractor's work.
- B. If this contractor should neglect to furnish the required information and by reason of his neglect chases and openings are not provided, the delinquent plumbing contractor shall, at his own expense, cut the required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.
- C. The cutting of chases, openings, or holes in floors and ceilings shall be done in a manner as not to endanger the stability of the structure or any part thereof. The Plumbing contractor's shall not in any case cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs resulting from cutting shall be under the supervision of the Superintendent of the General Contractor.

3.9 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the architect for clarification and resolution.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.10 JOB CONDITIONS:

- A. Safety: Observe all required safety regulations and the manufacturer's warnings and instructions during the storage, handling and applications of materials.
- B. Necessary precautions shall be taken to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion or other harm.
- C. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at the end of each day's work, in accordance with all applicable federal, state, and local codes.

END OF SECTION 22 01 00

SECTION 22 01 04 - DIVISION OF WORK (22/26)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section delineates the DIVISION OF WORK between Division 22 and Division 26.
- B. Specific work to be done under Division 26 is hereinafter listed or described. All other work necessary for the operation of Division 22 equipment shall be performed under Division 22.

1.2 DIVISION OF WORK:

- A. All individual motor starters for plumbing equipment (pumps, etc.) shall be furnished and installed under Division 22 unless indicated as a part of a motor control center or designated "motor control trough". Motor starters provided in motor control centers and at motor control troughs shall be furnished under Division 26.
- B. Under Division 26, power wiring rough-in shall be provided from junction box, trough, starter or disconnect switch, as required by the specific piece of equipment. Equipment final connections shall be provided under Division 26.
- C. All relays, actuators, timers, seven-day clocks, alternators, pressure, vacuum, float, flow, pneumatic-electric, and electric-pneumatic switches, aquastats, freezestats, line and low voltage thermostats, float switches, remote selector switches, remote push-button stations, emergency break-glass stations, interlocking wiring, disconnect switches required by Division 22 equipment, and other appurtenances associated with equipment under Division 22 shall be furnished, installed and wired under Division 22.
- D. All wiring required for controls and instrumentation not indicated on the drawings shall be furnished and installed by Division 22.
- E. Additional power wiring required for plumbing equipment over and above what is shown on electrical drawings shall be provided under Division 22 work.

END OF SECTION 22 01 04

SECTION 22 02 06 - ROUGH-IN AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Rough in for all items of equipment that require waste, vent or water connections, regardless of which contractor furnished the equipment.
- B. Make final connections to those items for equipment furnished by others except where specifically designated on the drawings or in these specifications otherwise.
- C. Generally, final connections to equipment shall be by the plumbing contractor.
- D. Generally, final connections to water heaters, and other equipment of this type will be by the plumbing contractor.

1.2 ROUGH-IN DRAWINGS:

- A. The plumbing contractor shall secure from each contractor furnishing items of equipment (requiring plumbing connections) roughing-in prints and complete detail shop drawings of all equipment, and review at the job each area with the respective contractor before roughing-in. Make all adjustments as required. In the event that the plumbing contractor fails to obtain the roughing-in prints for whatever reason, and roughs in the pipes at the wrong location, the pipes shall be relocated as required at the expense of the plumbing contractor. In the event that the plumbing contractor roughs in the pipes in accordance with prints furnished by the respective contractor, and it turns out that the pipes are in the wrong locations, any costs of relocating the roughed-in pipes will be paid by the contractor furnishing that item of equipment.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials shall be the same as are described in the specifications for the various piping systems.

END OF SECTION 22 02 06

SECTION 22 02 08 - PLUMBING IDENTIFICATION AND PAINTING

PART 1 - GENERAL

1.1 SCOPE:

- A. All exposed pipe, hangers, and equipment installed by this subcontractor shall be painted unless it has a factory finish or is noted otherwise. Exposed chromeplated brass, stainless steel, or plastic piping will not be painted.
- B. Type of identification devices specified in this section include the following:
 - 1. Plastic Pipe Markers
 - 2. Plastic Tape
 - 3. Valve Tags
 - 4. Valve Schedule Frames
 - 5. Engraved Plastic-Laminate Signs

1.2 QUALITY ASSURANCE:

- A. Manufacturers: Firms regularly engaged in manufacturer of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. ANSI Standards: Comply with ANSI A13.1 for lettering size, colors, and viewing angles of identification devices.

1.3 SUBMITTALS:

- A. Product Data: Submit product specifications and installation instructions for each identification material and device required.
- B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.
- C. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags," in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 22.

PART 2 - PRODUCTS:

2.1 PLASTIC PIPE MARKERS:

- A. Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, color-coded, plastic-sheet pipe markers, complying with ANSI A13.1.

- B. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:
 - 1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 - 2. Adhesive lap joint in pipe marker overlap.
 - 3. Laminated or bonded application of pipe marker to pipe (or insulation).
 - 4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1-1/2".

- C. Large Pipes: For external diameters of 6" and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
 - 1. Laminated or bonded application of pipe marker to pipe (or insulation).
 - 2. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
 - 3. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer's standard stainless steel bands.

- D. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.

- E. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.2 PLASTIC TAPE:

- A. Manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.

- B. Width: Provide 1-1/2" wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6", 2-1/2" wide tape for larger pipes.

- C. Color: Comply with ANSI A13.1, except where another color selection is indicated.

2.3 VALVE TAGS:

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener. Provide 1-1/2" diameter tags, except as otherwise indicated.

- B. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

2.4 VALVE SCHEDULE FRAMES:

- A. For each page of the valve schedule, provide a glazed display frame, with screws for removable mounting on walls. Provide frames of rigid plastic or metal, with plastic glazing.

2.5 ENGRAVED PLASTIC-LAMINATE SIGNS:

- A. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.
- C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6 LETTERING AND GRAPHICS:

- A. Coordinate names, abbreviations and other designations used in mechanical identification work with corresponding designations shown pre-existing, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.
- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H).

2.7 PAINT:

- A. All products shall be in accordance with the specifications for painting in the general contract.

PART 3 - EXECUTION:

3.1 GENERAL:

- A. Any equipment shipped with a factory applied finish shall be touched up to repair any damage to the finish so that it is the same as new.
- B. In the mechanical equipment rooms the plumbing contractor shall be responsible for painting all piping, equipment, and accessories installed under their respective contract.
- C. In other parts of the buildings items which are in place in finished areas when general building painting is done will be painted by the General Contractor. Items installed after painting is completed shall be painted by the plumbing contractor, as directed by the architect.

- D. All nongalvanized ferrous metal hangers and miscellaneous metal used in connection with the plumbing systems shall be painted with two coats of enamel.
- E. All exposed piping including insulated piping, insulated by this contractor shall be painted two coats of lead and oil paint. Elastomeric pipe insulation shall have two coats of enamel of the type recommended by the insulation manufacturer.
- F. Do not field paint exposed copper pipe, brass valves, or brass trim on iron body valves, or machinery or equipment that has a factory applied finish unless otherwise specified. Do not paint plastic pipe.
- G. Painted pipes which are buried in earth, shall be allowed to dry before backfilling.
- H. All paint shall be delivered to the project in unbroken containers. Containers shall be labeled to indicate color, directions for use, manufacture, and date of manufacturer. Directions for use of the paint shall be carefully followed in the mixing and general application. All paint shall be applied under dry and dust free conditions. Sufficient time shall elapse between paint coats to permit satisfactory recoating. Once started all painting shall be completed without delay.

3.2 PIPING SYSTEM IDENTIFICATION:

- A. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), exterior non-concealed locations and above removable acoustical ceilings.
 - 1. Near each valve and control device.
 - 2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - 3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - 4. At access doors, manholes and similar access points which permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
 - 7. On piping above removable acoustical ceilings.

3.3 PAINT SCHEDULE:

- A. All exposed equipment, pipes, conduits, or other appurtenances shall be painted by this sub-contractor with materials and application as specified in the general contract specifications and as directed by the architect.
- B. All concealed pipe covering shall be identified by colored bands and legends. The direction of flow shall be indicated by flow arrows.
- C. All exposed pipe covering shall be totally painted the color of the band color listed below. All exposed pipe hangers, rods, supports, channels, etc. shall be painted flat black.
- D. Color coding strips shall be painted no less than every 15 linear feet plus wherever entering or leaving a space and near valves. (Tape is acceptable). Width of strip

shall be approximately 1/5 of the diameter of pipe plus covering if any, but in no case less than 1/2 inch. Color coding shall conform OSHA requirement.

- E. Directions arrow and fluid name shall be applied by sticker at same spacing as above. The stickers shall be secured by color coded tape wrapped two times around the pipe at each end of the label or spring cords.
- F. Standard colors and legends are as follows: (Plumbing)
 - 1. **PIPE IDENTIFICATION:** Piping systems in mechanical rooms shall be completely painted with the applicable colors listed below and have appropriate self-sticking or strap-on identifications and arrows indicating direction of flow. Piping and ducts in chases above ceiling, etc. shall be color banded and have stencil markings at appropriate intervals. On straight runs of piping, markings should be no further than 30 feet apart; and stencil identifications, color bands, and direction arrows shall be near each valve, pressure reducing valve, heat exchanger, etc. Where pipe passes through walls or floors, marking shall be near the penetration on both sides. Markings shall be at each directional change of all piping systems. Mechanical room pipe color and the color of bands are to be as follows:

Piping System	Sherwin Williams Color Number	Stencil Color	Identification
Water, Cold Domestic	SW 4085	Safety Green	DOM CW
Water, Hot Domestic	SW 4083	Safety Orange	DHW
Water, Hot Domestic Recirculating	SW 4083	Safety Orange	DHWR
Gas	SW 4032	Safety Black	Gas
Supports, Hangers	SW 4032	Vacuum Black	

- G. Pipe identification should contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below.
- H. For insulated pipe systems, stencil sizes should be as follows:
 - 1. For pipes up to 1 inch, use 1 inch letters.
 - 2. For pipes 1 inch to 2 inches, use 2 inch letters.
 - 3. For pipes 2 inches to 6 inches, use 3 inch letters.
 - 4. For pipes above 6 inches, use 4 inch letters.
- I. For un-insulated systems, stencil sizes should be as follows:
 - 1. For pipe diameters up to 1 inch, use 1/2 inch letters.
 - 2. For pipe diameters from 1 inch to 2 inches, use 1 inch letters.
 - 3. For pipe diameters from 2 inches to 6 inches, use 2 inch letters.
- J. Valve handle shall be painted the same color as the stripes on the pipe.

3.4 VALVE IDENTIFICATION:

- A. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.
- C. Provide a 1" blue dot on ceiling grid for isolation valves above ceiling.

3.5 PLUMBING EQUIPMENT IDENTIFICATION:

- A. Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
 - 1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - 2. Pumps and similar motor-driven units.
- B. Lettering Size: Minimum 3/8" high lettering for name of unit where viewing distance is less than 2'-0", 3/4" high for distances up to 6'-0", and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 the size of principal lettering.
- C. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, and warn of hazards and improper operations.
- D. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.

END OF SECTION 22 02 08

SECTION 22 03 18 – COMPRESSED AIR PIPING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work consists of furnishing all piping, labor, materials, accessories and equipment required to install the compressed air system as shown, specified, and/or reasonable implied, for a complete first-class system.

PART 2 - PRODUCTS

2.1 PIPE, FITTINGS AND JOINTS:

- A. Pipe shall be hard drawn Type L copper tubing conforming to ASTM B-88. All pipe shall arrive to the site sealed and closed to be dust and oil free.
- B. Fittings shall be wrought copper conforming to ASTM B-16.22-1963. All fittings shall arrive to the site sealed and closed to be dust and oil free.

2.2 PIPING ACCESSORIES:

- A. Unions for joining similar metal shall be brass or bronze ground joint type. Unions for joining dissimilar metals shall be dielectric type as manufactured by Epco, Walter, Vallett, or Capitol Mfg. Co.
- B. Air Line Pressure Regulator- Parker, or approved equal high capacity series regulator. Regulator shall be a R119 Series rated for 300 psig working pressure. Provide with standard 0-125 psi adjustment range, 0-160 psig pressure gauge, unit mounting bracket, and with regulator pipe size as indicated on the drawings.
- C. Escutcheons shall be heavy spun of stamped chrome plated steel, split hinged.
- D. Drip pockets shall be pipe nipples and reducers with Dixon Model 17-016-017 (1/2" size) or approved equal drain valves.
- E. Valves shall be full glow bronze body double real ball type as manufactured by Conbraco- "Apollo" 77-100 Series, model numbers 77-103-1 (1/2" size) through 77-106-1 (1-1/4" size). Valve shall be rated for 600 PSI CWP, 150 PSI SWP pressure service.

2.3 AIR COMPRESSOR UNIT AND AIR DRYER: (AC-1 and AD-1)

- A. The air compressor with air dryer shall be furnished by the PC, refer to plan schedules for type and plan layout quantity/locations. The plumbing contractor shall provide the final connection.
- B. The air compressor (AC-1) shall be as manufactured by Quincy or approved equal. The air compressor shall be a two stage dual compressor type with a pressure rating of 175 PSIG. The unit shall have an automatic tank drain, oil sight glass, low oil level shutdown, and air-cooled

after cooler. The unit shall have a minimum 200 gallon ASME certified air tank and dual motor controls.

- C. The air dryer shall be as manufactured by Quincy or approved equal. The air dryer shall be a floor mounted type with R-404a refrigerant. Dryer shall have an "on-off" switch, refrigerant suction pressure gauge, and drain test button.

PART 3 - EXECUTION

3.1 PIPE FITTINGS:

- A. All fittings for copper tubing to be wrought copper brazing fittings.

3.2 PIPE JOINTS:

- A. All joints to be brazed except those at valves or equipment requiring screw connections.
- B. Use Sil-Phos silver solder and Handy flux.
- C. Borax and alcohol mixtures, resin or petroleum base paste flux are not permitted.
- D. Technique and joint preparation per manufacturer's instructions.
- E. Avoid excess flux inside joint.

3.3 SCREWED PIPE JOINTS:

- A. Thread of pipes, fittings and couplings shall conform to requirements of ANSI B2.1.
- B. Length of threading shall produce sufficient number of perfect threads to insure full metal to metal contact when screwed home.
- C. Ends shall be countersunk, reamed and cleaned of chips and burrs, inside and out.
- D. Connections shall be made up full with not more than one full thread exposed by such method as will obviate strains or twists in pipes and fittings.
- E. Joints shall be made up with teflon tape applied to the male thread only. Care shall be taken not to allow tape or debris to work into inside of pipe.
- F. Should leaking joints occur, when tests are made, such joints shall be dismantled, reinstalled and tested.
- G. Place hangers at all changes of pipe direction and at valves and fittings as necessary for adequate support.

3.4 GENERAL PIPING INSTALLATION:

- A. The contractor shall furnish and install complete system of piping as indicated on the drawings or as necessary to complete the working systems in accordance with the intent of the drawings and specifications.
- B. Piping systems shall be in accordance with the applicable requirements of the ANSI Code for Pressure Piping, ANSI B31.1-1955, incl. addendum 1963 and NFPA 56F.
- C. Piping system mains, branches and connections to outlets and equipment shall be valved as indicated or required to completely control the entire apparatus and/or appurtenances.
- D. Pipe elevations may be adjusted as required or directed at the job site. Such changes or deviations do not relieve the sub-contractor from responsibility for the proper erection of systems of piping indicated and/or specified.
- E. Piping shall be installed without spring or forcing and shall be properly supported. Adequate provisions shall be made for expansion, contraction, slope and anchorage. Allowable stress of any piping or fittings shall not be exceeded during installation system testing or under normal service conditions.
- F. Piping shall be cut accurate for fabrication to measurement established at the job site.
- G. Piping shall be installed without obstructing windows, doors, access panels or openings, or fixtures or equipment.
- H. Burrs and cutting slag shall be removed from cut pipe ends by reaming.
- I. Changes in direction shall be made with 45 degrees or degree ells, or tee fittings.
- J. Reducing fittings shall be used where required. No bushing will be permitted.
- K. Pipes shall be fitted with escutcheons at all exposed penetrations of walls, floors or ceilings. Escutcheons shall be of sufficient outside diameter to amply cover sleeved openings.

3.5 COMPRESSOR INSTALLATION:

- A. The compressor shall be mounted on concrete base or pad as shown on the plans. The mounting frame shall be grouted with cement to the base to assure a firm, level mounting.
- B. The compressor shall be connected to the piping system on the drawings.

3.6 AIR DRYER:

- A. The air dryer shall be installed adjacent to the compressor either on concrete pad or secured firmly as shown on the drawings.
- B. The dryer shall be connected into the compressed air system as shown.

3.7 TESTS AND INSPECTION:

- A. Authorized representative of the equipment manufacturer shall supervise, inspect and test the complete installation and verify that all requirements have been complied with, and shall instruct the Owner's designated representative in the operation and maintenance of the system.

3.8 TESTING:

- A. Blow lines clear after erection but before installation of outlet valves.
- B. Use water pumped (oil-free) nitrogen or air.
- C. Test each section at 150 psig during installation and before outlets connected, using soap suds test. Repair leaks and retest.
- D. When system is completely installed, make a final 24 hour standing pressure test.

END OF SECTION 22 03 18

SECTION 22 03 20 – GAS PIPING FOR ARGON, OXYGEN AND MIXED WELDING GASES

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. Oxygen designated "O."
2. Argon piping, designated "AR."
3. Mixed gas piping, designated "MA."

B. Owner-Furnished Material:

1. Ceiling columns.
2. Gas manifolds.
3. Bulk gas storage tanks.
4. Owner will furnish gases for gas concentration specified in this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For gas manifolds, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Material Certificates: Signed by Installer certifying that gas piping materials comply with requirements in NFPA 99 for positive-pressure gas systems.
- D. Brazing certificates.

- E. Certificates of Shop Inspection and Data Report for Bulk Gas Storage Tanks: As required by ASME Boiler and Pressure Vessel Code.
- F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For specialty gas piping specialties to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Quick-Coupler Service Connections: Furnish complete non-interchangeable gas pressure outlets and suction inlets.
 - a. Carbon Dioxide: Equal to 20 percent of quantity installed, but no fewer than 2 units.
 - b. Argon: Equal to 20 percent of quantity installed, but no fewer than 2 units.
 - c. Mixed Gas: Equal to 20 percent of quantity installed, but no fewer than 2 units.

1.7 QUALITY ASSURANCE

- A. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code, Section IX, "Welding and Brazing Qualifications"; or AWS B2.2, "Standard for Brazing Procedure and Performance Qualification."

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Oxygen operating at 50 to 55 psig.
- B. Argon operating at 50 to 55 psig.
- C. Mixed Gas operating at 50 to 55 psig.

2.2 PIPES, TUBES, AND FITTINGS

- A. Comply with NFPA 99 for gas piping materials.
- B. Copper Gas Tube: ASTM B 819, Type L, seamless, drawn temper that has been manufacturer cleaned, purged, and sealed for gas service.
- C. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type that has been manufacturer cleaned, purged, and bagged for oxygen service according to CGA G-4.1.

- D. Copper Unions: ASME B16.22 or MSS SP-123, wrought-copper or cast-copper alloy.
- E. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150.
 - 1. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, full-face type.
 - 2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel.
- F. Shape-Memory-Metal Couplings:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. AeroFit, Inc.
 - b. Smart Tap, Inc.
 - 2. Description: Cryogenic compression fitting made of nickel-titanium, shape-memory alloy, and that has been manufacturer cleaned, purged, and sealed for oxygen service according to CGA G-4.1.

2.3 JOINING MATERIALS

- A. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys.
- B. Threaded-Joint Tape: PTFE.

2.4 VALVES

- A. General Requirements for Valves: Manufacturer cleaned, purged, and bagged.
- B. Ball Valves:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Conbraco Industries, Inc.
 - b. NIBCO INC.
 - c. Grinnell
 - d. Apollo
 - 2. Standard: MSS SP-110.
 - 3. Description: Three-piece body, brass or bronze.
 - 4. Pressure Rating: 150 psig minimum.
 - 5. Ball: Full-port, chrome-plated brass.
 - 6. Seats: PTFE or TFE.
 - 7. Handle: Lever.
 - 8. Stem: Blowout proof with PTFE or TFE seal.
 - 9. Ends: Manufacturer-installed ASTM B 819, copper-tube extensions.
- C. Safety Valves:
 - 1. Bronze body.
 - 2. ASME-construction, poppet, pressure-relief type.
 - 3. Settings to match system requirements.

D. Pressure Regulators:

1. Stainless-steel body and trim.
2. Spring-loaded, diaphragm-operated, relieving type.
3. Manual pressure-setting adjustment.
4. Rated for 250-psig minimum inlet pressure.
5. Capable of controlling delivered gas pressure within 0.5 psig for each 10-psig inlet pressure.

2.5 GAS SERVICE CONNECTIONS

A. General Requirements for Gas Service Connections:

1. Suitable for specific gas pressure and suction service listed.
2. Include roughing-in assemblies, finishing assemblies, and cover plates.
3. Individual cover plates are not required if service connection is in multiple unit or assembly with cover plate.

B. Roughing-in Assembly:

1. Brass-body outlet block with secondary check valve that will prevent gas flow when primary valve is removed. Suction inlets to be without secondary valve.
2. Double seals that will prevent gas leakage.
3. ASTM B 819, NPS 3/8 (DN 10) copper outlet tube brazed to valve with service marking and tube-end dust cap.

C. Finishing Assembly:

1. Brass housing with primary check valve.
2. Double seals that will prevent gas leakage.

D. Quick-Coupler Pressure Service Connections: Outlets for carbon dioxide, Argon, and mixed gas, constructed to permit one-handed connection and removal of equipment, and with positive-locking ring that retains equipment stem in valve during use.

E. Cover Plates: One piece, stainless steel and permanent, color-coded, identifying label matching corresponding service.

2.6 GAS MANIFOLDS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Central Control-Panel Unit:

1. Weatherproof cabinet.
2. Supply and delivery pressure gages.
3. Electrical alarm-system connections and transformer.
4. Indicator lights or devices.
5. Manifold connection.
6. Pressure changeover switch.

7. Line-pressure regulator.
8. Shutoff valves.
9. Safety valve.

C. Manifold and Headers:

1. Duplex, nonferrous-metal header for number of cylinders indicated, divided into two equal banks.
2. Designed for minimum inlet pressure 1500 psig.
3. Cylinder-bank headers with inlet (pigtail) connections complying with CGA V-1.
4. Individual inlet check valves, shutoff valve, pressure regulator, check valve, and pressure gage.

D. Operation: Automatic, pressure-switch-activated changeover from one cylinder bank to the other when first bank becomes exhausted, without line-pressure fluctuation or resetting of regulators and without supply interruption by shutoff of either cylinder-bank header.

E. Mounting: Wall with mounting brackets for manifold control cabinet and headers.

F. Label manifold control unit with permanent label identifying gas type and system operating pressure.

G. Carbon Dioxide Manifolds: For 4 cylinders and 55 psig line pressure. By Others.

H. Argon Manifolds: For 4 cylinders and 55 psig line pressure. By Others.

I. Mixed Gas Manifolds: For 4 cylinders and 55 psi line pressure. By Others.

2.7 GAS MANIFOLDS

A. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

1. Airgas, Inc.
2. Air Products and Chemicals, Inc.
3. BOC Gases.
4. Praxair Technology, Inc.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Control-Panel Unit: Weatherproof cabinet, supply and delivery pressure gages, electrical alarm-system connections and transformer, indicator lights or devices, manifold connection, line-pressure regulator, shutoff valves, and safety valve.

D. Manifold and Header: Nonferrous-metal header for number of cylinders indicated. Units include design 1500 psig minimum inlet pressure, cylinder-bank header with inlet (pigtail) connections complying with CGA V-1, individual inlet check valves, shutoff valve, pressure regulator, check valve, and pressure gage.

E. Mounting: Wall with mounting brackets for manifold control cabinet and header.

F. Label manifold control unit with permanent label identifying specialty gas type and system operating pressure.

- G. Specialty Gas Cylinders: Furnished by Owner.

2.8 GAS CYLINDER STORAGE RACKS

- A. Wall Storage Racks: Fabricate racks with chain restraints for upright cylinders as indicated or provide equivalent manufactured wall racks. – By Others

PART 3 - EXECUTION

3.1 PREPARATION

- A. Cleaning of Gas Tubing: If manufacturer-cleaned and -capped fittings or tubing is not available or if precleaned fittings or tubing must be recleaned because of exposure, have supplier or separate agency acceptable to authorities having jurisdiction perform the following procedures:

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of gas piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and coordinate with other services occupying that space.
- E. Install piping adjacent to equipment and specialties to allow service and maintenance.
- F. Install nipples, unions, special fittings, and valves with pressure ratings same as or higher than system pressure rating used in applications specified in "Piping Schedule" Article unless otherwise indicated.
- G. Install piping to permit valve servicing.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and for branch connections.
- J. Install gas piping to gas service connections specified in this Section, to gas service connections in equipment specified in this Section, and to equipment specified in other Sections requiring gas service.

- K. Piping Restraint Installation: Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 22 05 48 "Seismic Protection for Plumbing Piping and Equipment."
- L. Connect gas piping to gas sources and to gas outlets and equipment requiring gas service.
- M. Install unions in copper tubing adjacent to each valve and at final connection to each specialty and piece of equipment.
- N. Install sleeves for piping penetrations of walls, ceilings, and floors.
- O. Install sleeve seals for piping penetrations of concrete walls and slabs.
- P. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."
- Q. Refer to details on Plumbing Drawings.

3.3 VALVE INSTALLATION

- A. Install shutoff valve at each connection to gas equipment and specialties.
- B. Install check valves to maintain correct direction of gas flow from gas supplies.
- C. Install valve boxes recessed in wall and anchored to substrate. Single boxes may be used for multiple valves that serve same area or function.
- D. Install pressure regulators on gas piping where reduced pressure is required.

3.4 JOINT CONSTRUCTION

- A. Remove scale, slag, dirt, and debris from outside of cleaned tubing and fittings before assembly.
- B. Threaded Joints: Apply appropriate tape to external pipe threads.
- C. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" chapter. Continuously purge joint with oil-free, dry nitrogen during brazing.
- D. Shape-Memory-Metal Coupling Joints: Join new copper tube to existing tube according to procedures developed by fitting manufacturer for installation of shape-memory-metal coupling joints.

3.5 GAS SERVICE COMPONENT INSTALLATION

- A. Install gas manifolds on concrete base anchored to substrate.
- B. Install gas cylinders and connect to manifold piping.
- C. Install gas manifolds with seismic restraints.
- D. Install bulk gas storage tanks and reserve supply tanks level on concrete bases. Set tanks and connect gas piping to tanks. Install tanks level and plumb, firmly anchored to concrete bases;

maintain tank manufacturer's recommended clearances. Orient tanks so controls and devices are accessible for servicing.

- E. Install bulk gas storage tanks and reserve supply tanks with seismic restraints.
- F. Plumbing Contractor is responsible for connecting to owner furnished equipment.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Section 22 05 48 "Seismic Protection for Plumbing Piping and Equipment" for seismic-restraint devices.
- B. Vertical Piping: MSS Type 8 or Type 42, clamps.
- C. Individual, Straight, Horizontal Piping Runs:
 - 1. 100 Feet and Less: MSS Type 1, adjustable, steel, clevis hangers.
 - 2. Longer Than 100 Feet: MSS Type 43, adjustable, roller hangers.
- D. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze. Comply with requirements in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment" for trapeze hangers.
- E. Base of Vertical Piping: MSS Type 52, spring hangers.
- F. Support horizontal piping within 12 inches of each fitting and coupling.
- G. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1/4 (DN 8): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3/8 and NPS 1/2 (DN 10 and DN 15): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 3/4 (DN 20): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
 - 4. NPS 1 (DN 25): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 - 5. NPS 1-1/4 (DN 32): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
 - 6. NPS 1-1/2 (DN 40): 10 feet (3 m) with 3/8-inch (10-mm) rod.
 - 7. NPS 2 (DN 50): 11 feet (3.4 m) with 3/8-inch (10-mm) rod.
 - 8. NPS 2-1/2 (DN 65): 13 feet (4 m) with 1/2-inch (13-mm) rod.
 - 9. NPS 3 (DN 80): 14 feet (4.3 m) with 1/2-inch (13-mm) rod.
 - 10. NPS 3-1/2 (DN 90): 15 feet (4.6 m) with 1/2-inch (13-mm) rod.
 - 11. NPS 4 (DN 100): 16 feet (4.9 m) with 1/2-inch (13-mm) rod.
 - 12. NPS 5 (DN 125): 18 feet (5.5 m) with 1/2-inch (13-mm) rod.
 - 13. NPS 6 (DN 150): 20 feet (6 m) with 5/8-inch (16-mm) rod.
 - 14. NPS 8 (DN 200): 23 feet (7 m) with 3/4-inch (19-mm) rod.
- I. Install supports for vertical copper tubing every 10 feet (3 m).

3.7 IDENTIFICATION

- A. Install identifying labels and devices for specialty gas piping, valves, and specialties. Comply with requirements in Section 22 02 08 "Plumbing Identification and Painting."
- B. Install identifying labels and devices for gas piping systems. Use the following or similar captions and color-coding for piping products:
 - 1. Oxygen, Argon and Mixed Gas: Black or white letters on gray background.

3.8 FIELD QUALITY CONTROL FOR SPECIALTY GAS

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Piping Leak Tests for Specialty Gas Piping: Test new and modified parts of existing piping. Cap and fill specialty gas piping with oil-free, dry nitrogen to pressure of 50 psig (345 kPa) above system operating pressure, but not less than 150 psig. Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
 - 2. Repair leaks and retest until no leaks exist.
 - 3. Inspect specialty gas regulators for proper operation.
- C. Remove and replace components that do not pass tests and inspections and retest as specified above.
- D. Prepare test and inspection reports.

3.9 PROTECTION

- A. Protect tubing from damage.
- B. Retain sealing plugs in tubing, fittings, and specialties until installation.
- C. Clean tubing not properly sealed, and where sealing is damaged, according to "Preparation" Article.

3.10 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain bulk gas storage tanks.

3.11 PIPING SCHEDULE

- A. Connect new tubing to existing tubing with memory-metal couplings.
- B. Specialty Gas Piping except Specialty Gas Larger Than NPS 3 (DN 80) and Operating at More Than 185 psig: Type L, copper tube; wrought-copper fittings; and brazed joints.

- C. Specialty Gas Piping Larger Than NPS 3 (DN 80) and Operating at More Than 185 psig:
Type K, copper tube; wrought-copper fittings; and brazed joints.

3.12 VALVE SCHEDULE

- A. Shutoff Valves: Ball valve with manufacturer-installed ASTM B 819, copper-tube extensions.

END OF SECTION 22 03 20

SECTION 22 05 12 - PIPING SPECIALTIES AND ACCESSORIES

PART 1: GENERAL

1.1 SCOPE OF WORK:

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1. Sleeves, Seals and Escutcheons
 - 2. Drip Pans
 - 3. Pipe Hangers, and Supports
 - 4. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 SLEEVES, SEALS AND ESCUTCHEONS:

- A. Provide sleeves for each pipe passing through walls, partitions, floors and roofs.
- B. Sleeve Material:

	<u>Type-</u>	<u>Designation</u>
1.	1	Schedule 40 galvanized steel pipe.
2.	2	Duro coated cast iron body pipe with flashing clamp device integral to the pipe sleeve, similar to J.R. Smith 1720 or equal.
3.	3	Ductile iron pipe sleeve with center flange, flange end and plain end, length and size of the sleeve to be determined by the plumbing sub-contractor, manufactured by Clow or equal
4.	4	Duro coated cast iron body pipe with flashing clamp device integral to the pipe sleeve, similar to J.R. Smith 1720 or equal.

C. Sleeve Sizes:

- 1. Sleeves for uninsulated pipe provide a minimum of ½" clearance between inside of sleeve and outside of pipe.
- 2. Sleeves for insulated piping shall be adequate size to accommodate the full thickness of pipe covering with a minimum ½" clearance for packing and caulking.

D. Sleeve Lengths:

<u>Location:</u>	<u>Sleeve Length</u>
1. Floors:	Equal to depth of floor construction including finish. In waterproof floor construction sleeves to extend minimum of 2" above finished floor level.
2. Walls and Partitions:	Equal to thickness of construction and terminated with surfaces

E. Sleeve and Caulking and Packing:

Type / Designation	Caulking and Packing Requirements
A	Space between pipe and sleeve packed with oakum or hemp and caulked watertight with lead.
B	Space between pipe or pipe covering and sleeve shall be caulked with a fire resistant foam sealant.

F. Sleeve Application:

Sleeve Type	Location	Sleeve Caulking & Packing Type Designation
2	Interior walls, partitions and floors	B
2	Membrane, waterproof floor, roof and wall construction	B (Note: Another trade will install membrane up around sleeve and inside sleeve.)
3 or 4	Exterior walls	A
5	No membrane, waterproof, roof and wall construction where flashing is required	A or B

G. Escutcheons:

1. Provide escutcheons on all exposed piping passing through walls, floors, partitions and ceilings.
2. Escutcheons shall be held in place by internal spring tension or set screws.
3. Application:

<u>Location:</u>	<u>Escutcheon Material</u>
------------------	----------------------------

- | | |
|---|---------------------------------------|
| 4. Finished spaces: | Anodized aluminum chrome-plated brass |
| 5. Unfinished spaces excluding mechanical equipment rooms | Plain brass, cast iron or aluminum |

H. Mechanical Sleeve Seals:

1. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering mechanical sleeve seals which may be incorporated in the work include, but are not limited to, the following:
 - a. Thunderline Corp.

2.2 DRIP PANS:

- A. Examine the Drawings and, in cooperation with the Electrical Trade, confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than two feet from a horizontal and vertical line to electric motor controllers, switchboards, panelboards or similar equipment.
- B. Where the installation of piping does not comply with the requirements of preceding paragraph, and where feasible, the piping shall be relocated or not practical as determined by the engineer. The plumbing contractor shall provide gutters as follows:
- C. Provide and erect a gutter of 18 gauge galvanized steel under every pipe which is within 2'-0" of being vertically over any motor, controllers, switchboards or the like.
- D. Each gutter shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining.
- E. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided extending 2'-0" in all directions beyond the electrical item, over which such piping has to run.
- F. Plumbing Contractor shall provide 3/4" drain to nearest floor drain or slop sink as approved.

2.3 PIPE HANGERS, SUPPORTS AND ANCHORS:

- A. All bracket, clamp and rod sizes indicated in this Specification are minimum sizes only. The installing trade shall be responsible for structural integrity of all supports. All structural hanging materials except variable spring units shall have a safety factor of 5 built in.
- B. Heavy-Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS Standards.
- C. For copper tubing, supports shall follow schedule and specifications. Supports for uncovered lines shall be especially designed for copper tubing, shall be of exact outside diameter of tubing and shall be copper plated.

- D. All hangers on piping including clevis hangers, inserts, clamps, stanchions, brackets, and rods shall be galvanized.
- E. Pipe supports shall be of the following type and figure number as manufactured by F&S or Grinnell and as hereinafter indicated.

Pipe Hanger Schedule	F&S	Grinnell
360 degree shield split	981	-
Multi-J hood plate	9293	-
Clevis hanger	86	260
120 degree shield	980	167
Pipe saddle	900 Series	160
U-bolt	37	137
Adjustable steel pipe stanchion	421	259
Welded steel bracket	800 or 801	195 or 199
Single bolt riser clamp	91 or 93	261
Double bolt riser clamp	92	Standard 40
Double bolt pipe clamp	89	295
Welded beam attachment W/B & N	966A	66
Insert	180-A, 180-B	280

- F. Double bolt riser clamps shall be F&S, F&M or Grinnell and shall be subject to approval.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.
- B. Prior to installation of hangers, supports, anchors and associated work, the plumbing contractor shall meet at project site with general contractor, installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section and Architect/Engineer for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified. This meeting shall be arranged by the plumbing contractor.

3.2 INSTALLATION OF BUILDING ATTACHMENTS:

- A. Install building attachments at required locations, within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.3 INSTALLATION OF HANGERS AND SUPPORTS:

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping, ductwork or other supported mechanical or electrical items.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- C. Support fire protection piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.
- E. Provisions for Movement: Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- F. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.
- H. Insulated Piping: Comply with the following installation requirements.
- I. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
- J. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.

3.4 INSTALLATION OF DRIP PANS:

- A. Each gutter shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining.
- B. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided and extending 2'-0" in all directions beyond the electrical item, over which such piping has to run.

3.5 INSTALLATION OF PIPE HANGERS AND SUPPORTS:

- A. Supports, hangers, and guides shall be provided for all horizontal and vertical piping in accordance with International Building Code and NFPA.
- B. All pipe supports shall be of type and arrangement as hereinafter specified. They shall be so arranged as to prevent excessive deflection and avoid excessive bending stresses.
- C. Provide all steel and concrete required for support and anchoring of pipes other than shown on Structural or Architectural Drawings.
- D. Structural Engineer must approve method of hanging before work is started. Plumbing Contractor shall bear all responsibility for materials and workmanship as described in this section and shall make sure that all hangers and supports are properly and permanently connected to building structure.
- E. All pipe supports shall be designed to avoid interference with other piping, hangers, electrical conduits and supports, building structures and equipment.
- F. Spacing of pipe hangers shall comply with the following schedule:

Spacing of Hangers

Size of Pipe	Copper	Steel	Cast Iron
1/2"	6	8	-
3/4" to 1"	8	8	-
1 1/4" to 3"	10	10	5
3 1/2" & Over	10	10	5

3.6 INSTALLATION OF MECHANICAL SLEEVE SEALS:

- A. Mechanical Sleeve Seals: Loosely assemble rubber links around pipe with bolts and pressure plates located under each bolt head and nut. Push into sleeve and center. Tighten bolts until links have expanded to form watertight seal.

3.7 ADJUSTMENT OF HANGERS AND SUPPORTS:

- A. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.8 EQUIPMENT BASES:

- A. Concrete bases shall be provided by the plumbing contractor. Prepare scaled layouts of all required bases with dimensions of bases, and location to column center lines. Furnish templates, anchor bolts, and accessories, necessary for base construction.
- B. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings.

END OF SECTION 22 05 12

SECTION 22 05 23 - VALVES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1. Gate Valves
 - 2. Check Valves
 - 3. Globe Valves
 - 4. Balancing Cocks
 - 5. Ball Valves
 - 6. Butterfly Valves
 - 7. Circuit Setters
 - 8. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 VALVES - GENERAL:

- A. Furnish and install valves shown on the drawings, specified herein and/or necessary for the control and easy maintenance of all piping and equipment. All valves shall be first quality of approved manufacture, shall have proper clearances, and shall be tight at the specified test pressure. Each valve shall have the maker's name or brand, the figure or list number and the guaranteed working pressure cast on the body and cast or stamped on the bonnet, or shall be provided with other means of easy identification. All valves shall be the product of one manufacturer except for special applications. Valves shall be Apollo, Nibco, Hammond, or Fairbanks. Where figure numbers of one manufacturer are stated, equivalent figure numbers can be substituted.
- B. Valves shall be of minimum working pressure and materials as fittings specified for the service except as herein modified. All gate and globe valves shall be suitable for repacking under pressure. Regardless of service, valves shall not be designed for less than 125 pounds per square inch steam working pressure.
- C. All throttling valves shall have a means of indicating valve position.

2.2 BRONZE GATE VALVES:

- A. Screwed Ends, Union Bonnets, Solid Wedge:
 - 1. Bronze Gates 125 # WSP
 - a. Hammond IB631
 - b. Nibco T-135
 - c. Fairbanks U-0253

- B. Solder Ends, Screwed Bonnets:
 - 1. Bronze Gates 125# WSP
 - a. Hammond IB648
 - b. Nibco S-134
 - c. Fairbanks 0282

- C. Flanged Ends:
 - 1. Iron Gates 125# WSP
 - a. Hammond IR1140
 - b. Nibco F-617-0
 - c. Fairbanks 0405

2.3 CHECK VALVES:

- A. Screwed ends, Union Bonnets:
 - 1. Bronze Checks 125# WSP
 - a. Hammond IB944
 - b. Nibco T-433-B
 - c. Fairbanks 0600

- B. Solder Ends, Screwed Bonnets:
 - 1. Bronze Checks 125# WSP
 - a. Hammond IB-945
 - b. Nibco S-433-B
 - c. Fairbanks 0680

- C. Flanged Ends
 - 1. Iron Checks 125# WSP
 - a. Hammond IR 1124
 - b. Nibco F-918-B
 - c. Fairbanks 0702

- D. Swing check valves used as vacuum breakers: 15 degrees swing check, composition disc, 150 WSP: Nibco Fig T-433-Y or equal. Valves shall be 3/8" size.

2.4 GLOBE VALVES:

- A. Screwed ends, union bonnets (composition or Teflon discs)
 - 1. Bronze Globes 150# WSP
 - a. Hammond IB413T (2-1/2" IB420)
 - b. Nibco T-235-Y
 - c. Fairbanks U-01

B. Solder ends, screwed bonnets (Teflon discs)

1. Bronze Globes 150#
 - a. Hammond 1B423
 - b. Nibco S-235-&
 - c. Fairbanks
2. Iron Globes 125# WSP
 - a. Hammond IR 116
 - b. Nibco F-718-B
 - c. Fairbanks 0131

C. Circuit Setters:

1. Circuit setters shall include brass balancing cock and taps for taking differential pressure readings. They shall be as manufactured by B&G, Taco, or Thrush.

2.5 BALL VALVES (2" AND BELOW)

- A. Nibco T-595W
- B. Jenkins 1100T
- C. Crane or approved equal

2.6 BUTTERFLY VALVES:

- A. Butterfly valves shall have aluminum bronze floating type disc; Buna-N hardback type seat for temperatures up to 170 deg., EPT seat for temperatures over 170 deg., stainless steel dry journal type stems. Bodies shall be wafer or lug type with extended necks adequate for 2" insulation above companion flanges. Operators shall be on-off or infinite throttling lever type in sizes 2" and 6", and gear operators for 8" and above.
- B. The valves shall close drop-tight from 28" vac to 150 psi pressure differential.
- C. They shall be Demco, Trane, Monarch, Dover, or approved equal. Butterfly valves shall not be used in steam piping systems.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
- B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.

- C. Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive installation.
- D. Applications Subject to Shock: Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.
- E. Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
- F. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections.
- G. Tube Size 2" and Smaller: Soldered-joint valves.
- H. Pipe Size 2" and Smaller: One of the following, at Installer's option:
 - 1. Threaded valves
 - 2. Grooved-end valves
 - 3. Butt-welding valves
 - 4. Socket-welding valves
 - 5. Flanged valves
 - 6. Flangeless valves
 - 7. Single flanges valves
- I. Pipe size 2-1/2" and larger: One of the following, at installer's option:
 - 1. Grooved-end valves
 - 2. Butt-welding valves
 - 3. Socket-welding valves
 - 4. Flanged valves
 - 5. Wafer valves
 - 6. Single flange valves
 - 7. Hub-and-spigot valves
 - 8. Mechanical joint end valves
- J. Valve System: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.
- K. Non-Metallic Disc: Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- L. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.
- M. Fluid Control: Except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.

- N. Ball valves may be used in lieu of gate valves for equipment shut-off in size 2" and under.
- O. Valves in positions where unauthorized closing could endanger safety or cause freezeups shall have wrench operation or lock shields and shall be marked with warning signs.
- P. Gate valves, globe valves, and strainers shall be a minimum of the pipe size marked on the drawings. Reductions where necessary because of equipment or automatic valve size shall be made with the proper eccentric reducing fittings immediately adjacent to the inlet and outlet of the automatic valve. Bypasses for automatic valves shall be full size of the valve. Provide a service valve on either side of each piece of equipment.

END OF SECTION 22 05 23

SECTION 22 05 48 - SEISMIC PROTECTION FOR PLUMBING PIPING, EQUIPMENT AND TRIM

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work shall consist of providing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter. In addition to any other items called for in other sections of this specification.
- B. Plumbing utilities, piping and equipment shall include the following items to the extent required on plans or in other sections of these specifications:
 - 1. Water piping - domestic
 - 2. Waste and vent piping
 - 3. Storm piping
 - 4. Gas piping
 - 5. Water heater
 - 6. Domestic water booster pump
- C. Submit as part of Division 22 work proposed method and details to support and restrain plumbing equipment and materials listed here against seismic disturbances. This information shall be prepared by a seismic design engineer registered in the same state as the project site. The equipment and materials requiring this service shall be as required by IBC 2003 Chapters 16 and 17.
- D. The submittal shall be prepared certified by an outfit with proven seismic engineering experience in this type of service. Submit qualifications of proposed outfit to A/E as part of materials list submittal. An organization with recognized proven experience are VMC-Southeast, Inc., 19901-E Henderson Rd. Cornelius, NC, Contact: John Crowley @ 704-896-3255 or fax @ 704-896-3256 and Seismic Control & Isolation, Inc., 11160 Downs Road, Pineville, NC 28134, Contact: Will Meckstroth, Phone: 704-504-8780, Fax: 704-504-9573. Other companies are equally acceptable upon submission of evidence of proven experience.
- E. Provide quality assurance services, as applicable and as required under Section 1705 of IBC 2003 for equipment and systems specified under this contract. These services shall be provided by a professional engineer registered in the state where the project is located and working for the contractor at the contractor's expense.
- F. Provide special inspection of the anchorage of the electrical equipment specified here, as applicable, in accordance with requirements of Section 1707 of IBC 2003. The inspections shall be accomplished at contractor's expense by qualified person that shall demonstrate competence to the satisfaction of the Building Inspector Official and the Engineer.
- G. In addition to the above, provide, as applicable, component and component mounting by the manufacturer of the equipment specified here for components having an important factor of 1.0 or 1.5 in accordance with Chapter 16 and paragraph 1707.7.2 of IBC 2003.

1.2 APPLICABLE PUBLICATIONS:

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
1. Federal Specifications (Fed. Spec.)
 - a. RR-W-401C - Wire rope and strand
 2. American National Standard Institute, Inc., (ANSI) Standards
 - a. B18.2.1-1981 - Square and hex bolts and screws, inch series
 - b. B18.2.2-1987 - Square and hex nuts (inch series)
 3. American Society for Testing and Materials (ASTM) Publications.
 - a. A307-86a - Carbon steel bolts and studs, 60,000 psi tensile strength
 - b. A576-87a - Steel bars, carbon, hot-wrought, special quality
 - c. A325-86a - High strength bolts for structural steel joints
 - d. A36-87 - Structural steel
 - e. A501-84- Hot formed welded and seamless carbon steel structural tubing
 4. Manufacturers Standardization Society of the Valves and Fittings Industry (MSS) Publications:
 - a. SP-58 - Pipe Hangers and Supports - Materials Design and Manufacture (1975)
 - b. SP-69 - Pipe Hangers and Supports - Selection and Application (1976)
 5. Underwriters Laboratories, Inc., (UL) Standards
 6. Building Materials Directory (January 1981 with Quarterly Supplements)
- B. Pipes that do not require special seismic restraints: seismic restraints may be omitted from the following installations:
1. Piping in mechanical equipment spaces less than 1-1/4" inside diameter.
 2. All other piping less than 2-1/2" inside diameter.
 3. All piping suspended by individual hangers 12" or less in length from the top of pipe to the bottom of the support for the hanger.
- C. Shop drawings along with catalog cuts, templates, and erection and installation details, as appropriate, for the items listed below shall be submitted. Submittals shall be complete in detail; shall indicate thickness type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation with relation to the building construction.
1. Sway braces
 2. Flexible couplings or joints
 3. Resilient type vibration devices
- D. Materials and Equipment: Materials and equipment shall conform to the respective specifications and other requirements specified below.

1. Bolts and Nuts
 2. Squarehead bolts and heavy hexagon nuts, ANSI B18.2 and ASTM A307 or A 576
 3. Bolts, underground, ASTM A325
- E. Sway Brace: Material used for members listed in Tables I through II of this specification, except for pipes, shall be structural steel conforming with ASTM A36. Steel pipes shall conform to ASTM A501.
- F. Flexible Couplings: Flexible couplings shall have same pressure ratings as adjoining pipe.
- G. Flexible ball joints conforming to the following requirements may be employed on aboveground pipe. Joints shall have cast or wrought steel casing and ball parts capable of 360-degree rotation plus not less than 15-degree angular movement. Joints shall be certified to be suitable for the service intended by the manufacturer, based on not less than 2 years satisfactory operation in a similar application.
- H. Guy wires shall conform to Fed. Spec. RR-W-410, as follows:
- | | | |
|----|-------------------------|-----------------|
| 1. | 5/32" diameter | Type V, Class 1 |
| 2. | 3/16" to 5/16" diameter | Type V, Class 2 |
| 3. | 1/4" to 5/16" diameter | Type I, Class 2 |
- I. Sway Braces: Sway braces shall be installed on piping not otherwise rigidly anchored to preclude damage during seismic activity as follows:
1. All piping in mechanical equipment rooms 1-1/4" and larger.
 2. All other piping 2-1/2" and larger.
 3. Pipes and conduits suspended by individual hangers 12" or less in length from the top of pipe, conduit, or duct to the bottom of the structural support for the hanger, do not require sway braces.
 4. Bracing shall generally conform to the details shown on the construction documents or to an approved alternate which can be demonstrated to be its equivalent. Provisions of this paragraph apply to all piping within a 5' line around outside of building unless buried in the ground. Piping grouped for support on trapeze type hangers shall be braced at the same intervals as hereinafter provided for individual pipe runs, with details increased in cross section area proportionate to the increased weight per linear foot of pipe and contents supported at each trapeze hanger. No trapeze type hanger shall be secured with less than two 1/2" bolts. Bracing rigidly attached to pipe flanges, or similar, shall not be used where it would interfere with thermal expansion of hot water piping operating at temperature above 140°F.

1.3 SWAY BRACES FOR PIPE AND CONDUITS:

- A. Transverse sway bracing shall be provided at 30' intervals for pipes and conduits 8" size and smaller and at 20' intervals for larger pipes and conduits except for cast iron soil which shall be braced at 10' intervals. Reference Table 1.
- B. Longitudinal sway bracing shall be provided at 40' intervals.

- C. Vertical runs of copper piping 4" and smaller and steel or cast iron piping 2" and smaller, extending between floor levels or between floor and roof shall be braced at midpoint.
- D. Anchor rods, angles and bars shall be bolted to either pipe clamps or pipe flanges at 1 end and cast-in-place concrete or masonry inserts or clip angles bolted to the steel structure on the other end. Rods may be solid metal or pipe as specified hereinafter.
- E. Clamps on uninsulated pipes shall be applied direct. Insulated piping shall have clamps applied over insulation vapor barrier with high density inserts and metal protection shields under each clamp.
- F. Bolts used for attachment of anchors to pipe and structure shall be not less than 1/2" in diameter.

1.4 TABLES

TABLE I
 MAXIMUM SPAN FOR TRANSVERSE SWAY BRACES IN SEISMIC ZONE 4

Pipe Diameter (in.)	Std. Wgt. Steel Pipe – 40S		Ex. Strong Steel Pipe – 80S		Copper Tube Type L	
	*L(ft.)	**F(lbs)	*L (ft.)	**F(lbs.)	*L(ft)	**F(lbs)
1	22	70	22	80	11	17
1-1/2	25	140	26	180	12	35
2	29	220	30	290	14	70
2-1/2	32	380	33	460	15	110
3	34	550	35	710	17	150
3-1/2	36	730	38	930	18	220
4	39	960	40	1,200	19	300
5	41	1,440	44	1,900	20	470
6	45	2,120	46	2,750	22	730

*L - Maximum span between lateral supports multiplied by 1.1 for zone 3, 1.25 for zone 2, or 1.35 for zone 1.

**F - Horizontal force on the brace multiplied by 0.8 for zone 3, 0.5 for zone 2, or 0.3 for zone 1.

NOTE: Bracing shall consist of at least 1 vertical angle 2 x 2 x 16 gauge and 1 diagonal angle of the same size.

TABLE II
 MAXIMUM LENGTH FOR ANCHOR BRACES

Type Brace	Maximum Actual Length	Allowable Loads * (Kips)
Angles		
1-1/2 x 1-1/2 x 1/4"	4'-10"	5.7
2 x 2 x 1/4"	6'-6"	7.8
2-1/2 x 2-1/2 x 1/4"	8'-0"	9.8
3 x 2-1/2 x 1/4"	8'-10"	10.8
3 x 3 x 1/4"	9'-10"	11.9
Rods		
3/4"	3'-1"	3.7
7/8"	3'-7"	5.0

Flat Bars		
1-1/2 x 1/4"	1'-2"	3.1
2 x 1/4"	1'-2"	4.1
2 x 3/8"	1'-9"	6.2
Pipe		
1" (Sch 40)	7'-0"	4.1
1-1/4" (Sch 40)	9'-0"	5.5
1-1/2" (Sch 40)	10'-4"	6.6
2" (Sch 40)	13'-1"	8.9

*Based on the slenderness ratio of $l/R = 200$ and ASTM A 36 steel

1.5 SPREADERS:

- A. Spreaders shall be provided between racked or adjacent piping runs to prevent contact during seismic activity whenever pipe or insulated pipe surfaces are less than 2" apart or 4 times the maximum displacement due to seismic force. Spreaders shall be applied to surface of bare or insulated hop pipe and over insulation utilizing high density inserts and pipe protection shields where vapor barrier type insulation is employed.

1.6 FLEXIBLE COUPLINGS OR JOINTS:

- A. Flexible couplings or joints in building piping shall be provided at bottom of all pipe risers 4" size and larger. Cast iron waste and vent piping need only comply with these provisions when leaded caulked joints are used. Flexible B&S pipe joints using rubber gaskets or no-hub fittings may be used adjacent tees and elbows for underground cast iron waste piping inside buildings to comply with these requirements.
- B. All underground piping in seismic zone 2 shall have flexible couplings installed adjacent to buildings. Additional flexible couplings shall be provided at all points that can be considered to act as anchors, such as all tees and abrupt changes in directions. Flexible joints specified for potable water, gas, and sanitary sewer systems, as covered by other sections of these specifications, provide the flexibility required by this paragraph.

1.7 RESILIENT VIBRATION ISOLATION DEVICES:

- A. When resilient and spring type vibration devices are used to support equipment located in seismic zone 2 they shall be capable of restraining the equipment from a horizontal force equivalent to 1/4 the total weight of equipment it supports without permanent deformation or other permanent impairment of its vibration isolating function.

1.8 ANCHOR BOLTS:

- A. All floor or pad mounted packaged equipment required by any section of these specifications shall use cast-in-place anchor bolts. Anchor bolts must conform to ASTM A307. Four nuts on each bolt shall be provided in seismic zone 2. Anchor bolts shall have embedded straight length equal to at least 12 times the nominal diameter of the bolt and shall conform to the following table of sizes for various

equipment weights or manufacturer's recommendations, whichever is more stringent.

<u>Maximum Equipment Weights</u>	<u>Minimum Bolt Sizes* (Zone 2)</u>
500 pounds	3/8"
1,000 pounds	1/2"
5,000 pounds	5/8"
10,000 pounds	3/4"
20,000 pounds	7/8"
30,000 pounds	1"
50,000 pounds	1 1/4"
100,000 pounds	1 1/2"

*Based on 4 bolts per item, a minimum bolt spacing of 16 bolts diameter and a minimum edge distance of 12 bolts diameters. Use equivalent total cross sectional areas when more than 4 bolts per item are provided.

- B. Anchor bolts which exceed normal depth of equipment foundation piers or pads shall either extend into concrete floor, or the foundation shall be increased in depth to accommodate bolt lengths.
- C. Expansion anchors shall not be used to resist seismic or vibratory loads unless test data are provided to verify the adequacy of the specific anchor and application. In no case shall the expansion anchor size be less than that required for bolts in the preceding table.
- D. Equipment Sway Bracing: Equipment sway bracing shall be provided for all items supported by off-the-floor structures or structures suspended from floors or roof above. Braces, shall consist of angles, rods, bars, or pipes arranged run at a 45 deg. angle as shown in detail from the equipment frame to the building structure secured at both ends with not less than 1/2" bolts. Braces shall conform to Table I hereinbefore. Bracing shall be provided in 2 planes of directions, 90 degrees apart, for each item of equipment. In lieu of diagonal of bracing with vertical support, items may be supported with hangers inclined at 45 degrees directed up and radially away from equipment and oriented symmetrically in 90-degree intervals on the horizontal plane, bisecting the angles of each corner of the equipment, provided supporting members are properly sized to support full operating weight of equipment when hangers are inclined at a 45 degree angle.

1.9 SUBMITTALS:

- A. Shop drawings shall be submitted on all items in accordance with the provisions of specification Section 22 01 00.

END OF SECTION 22 05 48

SECTION 22 05 50 - NOISE AND VIBRATION CONTROL FOR PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this section.

1.2 WORK INCLUDED

- A. Provide complete noise control systems as shown or specified and in accordance with the requirements of the Contract Documents. System shall be complete with:
 - 1. Foundations and supports for rigidly supported equipment.
 - 2. Vibration Isolation Equipment
 - 3. Sealing Around Services Penetrations Through Walls and Slabs

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Consult all other Sections to determine the extent of work specified elsewhere but related to this Section. This work shall be properly coordinated to produce an installation satisfactory to the Owner. This work includes, but is not limited to the following:
 - 1. Piping
 - 2. Noise and Vibration Control for Electrical Systems
 - 3. Sealant

1.4 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall be responsible for verifying the completeness of the isolation installation and the overall suitability of the equipment to meet the intent of this specification. The Contractor, even if not specifically mentioned herein or in the Contract Documents, shall supply any additional equipment needed to meet the intent of this specification, without claim for additional payment.
- B. Performance or waiving of inspection, testing or surveillance for any portion of the Work shall not relieve the Contractor of the responsibility to conform strictly to the Contract Documents. The Contractor shall not construe performance or waiving of inspection, testing or surveillance by the Owner or Architects to relieve the Contractor from total responsibility to perform in strict accordance with the Contract Documents.
- C. The intent of the designers is that there are no conflicts between this and other sections of the specification. If conflicts are discovered between this section and any other section or subsection of Division 22, it shall be the contractor's responsibility to immediately bring this fact to the architect's attention and request instruction. Absent that instruction, the contractor shall assume that this current section shall overrule in any conflicts.

1.5 MANUFACTURER'S RESPONSIBILITIES

- A. Manufacturer of vibration isolation equipment shall have the following responsibilities:
 - 1. Provide piping and equipment isolation systems as scheduled or specified.

2. Guarantee specified isolation system deflection.
 3. Provide installation instructions, drawings and field supervision to assure proper installation and performance.
- B. The vibration isolation systems shall be guaranteed to have deflection indicated on the schedule on the drawings. The mounting manufacturer shall determine mounting sizes and the sizes shall be installed in accordance with the manufacturer's instructions.
- C. The vibration isolator vendor shall ensure that all equipment to be isolated has sufficient support structure to distribute equipment loads onto isolators. Where additional support structure is required, vibration isolator vendor shall provide this.

1.6 BID PROPOSALS

- A. The Contractor shall submit at the time of bidding the names and qualifications of the noise and vibration control supplier(s). If a supplier is not one of the pre-approved vendors, then the submittal shall be accompanied by a complete catalog of that supplier's products and samples of each proposed vibration isolator.
- B. Contractor shall submit at the time of bidding the design octave band sound power level of each air moving device (including fans and package air handlers) as described in the Contract Documents. If the actual sound power generated by any device exceeds in any octave band the specified sound power levels for the equipment specified in the Contract Documents, the contractor shall include in his price system modifications as required to compensate for the additional noise at no expense to the Owner. Any system modification shall be subject to review and approval.
- C. If the standard sizes of silencers (attenuators) offered by the supplier do not provide attenuation equal to or greater than the insertion loss specified in the schedule in each octave band 1 through 5, then at the time of bidding the supplier shall note all such discrepancies and propose how to make up the difference within the bid quote. The controlling requirements are the insertion loss, pressure drop and self-noise.

1.7 SUBMITTALS

- A. Contractor shall submit fully coordinated shop drawings for all vibration and noise control equipment. These submittals shall state the acoustical performance of the products as described below.
1. Isolators: Submittal to the Architect shall include drawings *prepared by the isolation materials manufacturer* showing the construction of the isolation devices to be used, including specific selection of isolators for the equipment to be furnished for this project.
- B. Submittal of vibration isolation system schedule indicating the following:
1. Manufacturer, type, model number, size
 2. Height when uncompressed and static deflection of each isolation element
 3. Spring constant of each isolation element
 4. Estimated imposed load on each isolation element
 5. Spring o. d., free operating and solid heights
 6. Design of supplementary bases, if any

7. Layout of isolator hangers, mounts and other elements shown on an outline of the isolated equipment, including complete details of attachment to load-bearing structure or supplementary framing
8. Piping isolators shown and identified on piping layout drawing
9. All concrete foundations and supports (and required reinforcing and forms) will be furnished and installed by another trade. However, this trade shall furnish shop drawings showing adequate concrete reinforcing steel details and templates for all concrete foundations and supports and all required hanger bolts and other accessories necessary for the proper installation of his equipment. Although another trade will complete all concrete work, all such work shall be shown in detail on the shop drawings, prepared by this trade which drawings shall be submitted showing the complete details of all foundations including necessary concrete and steel work, vibration isolation devices, etc.

1.8 NOISE CRITICAL SPACES

- A. Many areas of the building, referred to as "noise-critical spaces", require special attention (special acoustical provisions and restrictions). The table below designates the noise-critical spaces; noise levels due to equipment, ductwork, grilles, registers, terminal devices, diffusers, etc., shall permit attaining sound pressure levels in all 8 octave bands in occupied spaces conforming to NC levels per ASHRAE handbook as indicated.

1. NC Level
 - a. NC 20
 - b. NC 25
 - c. NC 35
 - d. NC 20
 - e. NC 25
 - f. NC 30
 - g. NC 40
 - h. NC 35
 - i. NC 35
 - j. NC 30

- B. Penetrations by ducts, pipes and conduit into or between noise critical spaces should be avoided. Where they are necessary, they shall be sleeved, packed and sealed airtight with non-hardening sealant as described herein.

1.9 DESCRIPTION OF SYSTEMS

- A. **VIBRATION ISOLATION:** Building structure can provide a direct path for mechanically induced vibration to travel from mechanical equipment to noise critical spaces. Rotating or vibrating equipment such as pumps, boilers and pipes shall be mounted on or suspended from vibration isolators to attenuate the vibration transfer from equipment into the building structure.
- B. **SEALING OF PENETRATIONS:** Building structures meant to isolate air-borne noise surround noise critical spaces and spaces that contain noise, i.e. mechanical equipment rooms. These building structures must be massive, airtight constructions. The effectiveness of sound isolating structures can be severely compromised by penetrations for ductwork and piping. Proper sealing and/or lagging (enclosure) around mechanical services penetrating these structures will maintain the integrity of the isolating structure.

1.10 QUALITY ASSURANCE

- A. It is the objective of this Specification to provide for the control of noise and vibration due to the operation of machinery or equipment, and/or due to interconnected piping, ductwork or conduit.
- B. The installation of all noise and vibration control systems shall be under the supervision of the manufacturer's representative.
- C. A single manufacturer shall provide all vibration isolation equipment and materials. The following manufacturers are approved provided systems are in compliance with the specified design and performance requirements. The project acoustics consultant must approve any others.
 - 1. Mason Industries, Inc., Hauppauge, New York
 - 2. Vibration Mountings and Controls, New Hyde Park, NY
 - 3. Kinetics Noise Control, Dublin, Ohio

PART 2 - PRODUCTS

2.1 GENERAL

- A. All equipment provided for vibration isolation or noise control shall be new and manufactured specifically for the purpose intended.

2.2 FOAM ROD

- A. Foam backer rod shall be closed cell polyethylene suitable for use as a backing for non-hardening sealant.

2.3 NON-HARDENING SEALANT

- A. Sealant for penetrations shall be non-hardening polysulphide type.
- B. Permanently flexible, approved firestop putty may be used in lieu of the sealant on foam rod in noise critical walls that are also fire rated.

2.4 PACKING MATERIAL FOR PENETRATIONS

- A. Mineral fiber; non-combustible; resistant to water, mildew and vermin. Expanding resilient foams manufactured for this purpose are an acceptable alternative only if the material density is at least 15 pcf (40 kg/m³).

2.5 VIBRATION ISOLATION SYSTEMS

- A. The static deflection of isolators shall be as given in the equipment schedule and specified below. The isolator schedule shall take precedence.
 - 1. The vibration isolator supplier shall determine vibration isolator sizes and layout.
 - 2. All vibration isolators shall have either known undeflected heights or calibration markings so that, after adjustment, verified, thus determining that the load is within

the proper range of the device and that the correct degree of vibration isolation is being provided according to the design.

3. All isolators shall operate in the linear portion of their load versus deflection curve. Load versus deflection curves shall be furnished by the manufacturer and must be linear over a deflection range of not less than 50% above the design deflection.
4. The theoretical vertical natural frequency for each support point, based upon load per isolator and isolator stiffness, shall not differ from the design objectives for the equipment as a whole by more than $\pm 10\%$.
5. All neoprene mountings shall have a Shore hardness of 30 to 60 ± 5 , or as specified herein, after minimum aging of 20 days or corresponding over-aging.
6. Housed or caged spring isolators are not acceptable.
7. Where steel spring isolation systems are described in the specifications, the mounting assemblies shall utilize bare springs with the spring diameter not less than 0.8 of the loaded operating height of the spring. Each spring isolator shall be designed and installed so that the ends of the spring remain parallel during and after the spring installation. All isolators shall operate in the linear portion of their load versus deflection curve and have 50% excess capacity without becoming coil bound.
8. All mounting systems exposed to weather and other corrosive environments shall be protected with factory corrosion resistance. All metal parts of mountings (except springs and hardware) shall be hot dip galvanized. Springs shall be cadmium plated and neoprene coated. Nuts and bolts shall be cadmium plated.

B. ISOLATOR TYPE WP

1. Type WP (Waffle Pads) shall be 5/16 inch thick neoprene pads ribbed or waffled on both sides. The pads shall be manufactured with bridge bearing quality neoprene and selected for a maximum durometer of 50 and designed for 15% strain. Where required, steel load-spreading plates shall be incorporated between the equipment and the neoprene pad.
2. If the isolator is bolted to the structure, a neoprene vibration isolation washer and sleeve (Uniroyal Type 620/660 or as approved) shall be installed under the bolt head between the steel washer and the base plate.
3. (Type WP: Mason Industries Type W or as approved.)

C. ISOLATOR TYPE MWP

1. Type MWP (Metal and Waffle Sandwich Pads) shall consist of two 5/16 inch thick ribbed or waffle neoprene pads sandwiching a 16 gauge stainless steel shim plate. The pad shall be manufactured with bridge bearing quality neoprene and selected for a maximum durometer of 50 and designed for 15% strain.
2. If the isolator is bolted to the structure, a neoprene vibration isolation washer and sleeve (Uniroyal Type 620/660, or as approved) shall be installed under the bolt head between the steel washer and the base plate.
3. (Type MWP: Mason Industries Type WSW or as approved.)

D. ISOLATOR TYPE DDNM

1. Type DDNM (Double Deflection Neoprene Mounts) shall be laterally stable, double deflecting, molded neoprene isolators. All metal surfaces shall be covered with neoprene. The top and bottom surfaces shall be ribbed and bolt holes shall be

provided in the base. The mounts shall have leveling bolts rigidly secured to the equipment.

2. The isolator shall be manufactured with bridge bearing quality neoprene and selected for a maximum durometer of 50 and designed for 15% strain. DDNM mounts shall be selected for a static deflection of 3/8 inch unless otherwise specified.
3. (Type DDNM: Mason Industries Type ND or as approved.)

E. ISOLATOR TYPE DDNH

1. Type DDNH (Double Deflection Neoprene Hangers) shall consist of a molded neoprene isolating element in a steel hanger box. A neoprene sleeve shall be provided where the lower hanger rod passes through the steel hanger box, such that the hanger rod cannot contact the steel hanger. The diameter of the clear hole in the hanger box shall be at least 3/4 inch larger than the diameter of the hanger rod and permit the hanger rod to swing through a 30 degree arc. When installed, the hanger box shall be allowed to rotate through a full 360 degrees without encountering any obstructions.
2. The isolator shall be manufactured with bridge bearing quality neoprene and selected for a maximum durometer of 50 and designed for 15% strain. Unless otherwise specified, the static deflection of DDNH hangers shall be 0.3 inches.
3. (Type DDNH: Mason Industries Type HD or as approved.)

F. ISOLATOR TYPE RBA

1. Type RBA isolators shall be designed with a neoprene element to provide isolation in tension, shear or compression. Neoprene to bridge bearing quality with a maximum durometer of 50.
2. (Type RBA: Mason Industries Type RBA or as approved)

G. ISOLATOR TYPE SPNM

1. Type SPNM (Spring and Neoprene Mounts) shall have a free-standing and laterally stable steel spring without any housing. Springs shall be designed so that the ratio of the horizontal to vertical spring constant is between one and two. The spring diameter shall be not less than 80% of the compressed height of the spring at rated load. Loaded springs shall have a minimum additional travel to solid equal to 50% of the specified static deflection.
2. Unless otherwise specified, the minimum static deflection of SPNM isolators for equipment mounted on grade slabs shall be 1 inch and the minimum static deflection for equipment mounted above grade level shall be 2 inches.
3. Two Type WP isolation pads sandwiching a 16 gauge stainless or galvanized steel separator plate shall be bonded to the isolator baseplate.
4. Unless otherwise specified, isolators need not be bolted to the floor for indoor installations. If the base plates are bolted to the structure, a neoprene vibration isolation washer and sleeve (Uniroyal Type 620/660 or as approved) shall be installed under the bolt head between the steel washer and the base plate.
5. (Type SPNM: Mason Industries Type SLFSW or as approved.)

H. ISOLATOR TYPE SPNH

1. Type SPNH (Spring and Neoprene Hangers) shall consist of a steel spring in series with a neoprene isolating element. The spring shall have a minimum additional travel to solid equal to 50% of the specified deflection. The neoprene element shall have a static deflection of not less than 0.3 inches with a strain not exceeding 15%.
2. Unless otherwise specified, the static deflection of SPNH hangers shall be 2 inches.
3. Spring diameter and hanger box hole size shall be large enough to permit the hanger rod to swing through a 30 degree arc. A neoprene sleeve shall be provided where the lower hanger rod passes through the steel hanger box, such that the hanger rod cannot contact the steel hanger. The diameter of the clear hole in the hanger box shall be at least 3/4 inch larger than the diameter of the hanger rod. When installed, the spring element shall not be cocked and the hanger box shall be allowed to rotate through a full 360 degree arc without encountering any obstructions. When installed and loaded, if the threaded rod touches the neoprene at the bottom of the hanger box, instructions shall be given to make an adjustment.
4. (Type SPNH: Mason Industries Type 30N or as approved.)

I. ISOLATOR TYPE CSNM

1. Type CSNM (Constrained Spring and Neoprene Mounts) shall be a spring and neoprene mount that incorporates a housing which incorporates unrestrained stable springs with built-in leveling device and resilient vertical limit stops to prevent spring elongation when partial load is removed and limits the movement of equipment when it is subjected to wind loading.
2. A minimum clearance of 1 inch shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring operation. Limit stops shall provide minimum 1/4" clearance under normal operation and a neoprene washer shall be installed beneath the bolt head/ washer used to restrain the isolator.
3. In installations subject to wind load, provide tapped hole in top and bottom plates for bolting to equipment and the roof or supporting structure with a neoprene mounting sleeve.
4. Provide minimum 1/4" inch thick neoprene acoustical base pad on underside of mount unless designated otherwise.
5. Mount shall be capable of supporting equipment at a fixed elevation during equipment erection. Installed and operating heights shall be identical.
6. Unless otherwise specified, the minimum static deflection for Type CSNM mounts shall be 2 inches.
7. Spring diameter and hanger box hole size shall be large enough to permit the hanger rod to swing through a 30 degree arc. A neoprene sleeve shall be provided where the lower hanger rod passes through the steel hanger box, such that the hanger rod cannot contact the steel hanger. The diameter of the clear hole in the hanger box shall be at least 3/4 inch larger than the diameter of the hanger rod. When installed, the spring element shall not be cocked and the hanger box shall be allowed to rotate through a full 360 degree arc without encountering any obstructions. When installed and loaded, if the threaded rod touches the neoprene at the bottom of the hanger box, instructions shall be given to make an adjustment.
8. (Type CSNM: Mason Industries Type SLR or as approved)

J. BASE TYPE CB

1. Inertia base Type CB (Concrete Base) shall have an integral rectangular structural steel form into which concrete is poured.
2. Perimeter members shall be beams of depth equal to 10% of the longest span of the base, but not more than 12 inches nor less than 6 inches deep. Forms shall include motor slide base and all reinforcing steel. Where anchor bolt locations fall in concrete, the reinforcing steel shall include drilled members with sleeves welded below the steel to accept the anchor bolts. Height saving steel brackets shall be used in all mounting locations.
3. When the concrete base is "T" shaped, isolators shall be located under the projections as well as under the main body in order to prevent cantilever distortion.
4. The structural perimeter frame, mounting templates, height saving brackets and spring system shall be provided as an assembly by the vibration control vendor.
5. (Base Type CB: Mason Industries Type KSLFSW or as approved)

2.6 NEOPRENE MOUNTING SLEEVES

- A. Neoprene mounting sleeves for hold-down applications of equipment with vibration isolators shall be Uniroyal Type 620/660 or as approved.

2.7 PIPE FLEXIBLE CONNECTORS

- A. Flexible connectors for pipes shall be neoprene Mason Type MFNEC, MFTNC or as approved. Do not use control rods.

PART 3 - EXECUTION

3.1 GENERAL

- A. All equipment, piping, etc. shall be mounted on or suspended from approved foundations and supports, all as specified herein, or as shown on the drawings.
- B. Furnish and install neoprene mounting sleeves for hold-down bolts to prevent any metal to metal contact.
- C. All equipment shall be provided with lateral restraining isolators as required to limit horizontal motion to 1/4" maximum, under all operating conditions. Lateral restraining isolators shall have the same having the same static deflection as equipment being isolated.
- D. Unless otherwise indicated, all equipment mounted on vibration isolators shall have a minimum operating clearance of 2 inches between the bottom of the equipment or inertia base (and height-saving bracket) and the concrete housekeeping pad (or bolt heads) beneath the equipment. The clearance shall be checked by the Contractor to ensure that no material has been left to short- circuit the vibration isolators. There shall be a minimum 4 inch clearance between isolated equipment and the walls, ceiling, floors, columns and any other equipment not installed on vibration isolators.
- E. Piping, conduit or mechanical equipment shall be supported from building structure, not hung from or supported on other equipment, pipes, or ductwork.

- F. Equipment connected to water or other fluid piping shall be erected on isolators or isolated foundations at correct operating heights prior to connection of piping and blocked-up with temporary shims to final operating height. When the system is assembled and fluid is added, the isolators shall be adjusted to allow removal of the shims.
- G. All plumbing equipment not specifically identified in this specification that contains rotating or vibrating elements and any associated electrical apparatus installed by this division that contains transformers or inductors shall be installed on Type DDNM or RBA neoprene isolators as appropriate.
- H. All wiring connections to mechanical equipment on isolators shall be made with a minimum 36 inch long flexible conduit in a 180 degree "U" shaped loop.
- I. Elastomeric isolators that will be exposed to temperatures below 32 degrees F shall be fabricated from natural rubber instead of neoprene.
- J. Springs shall be designed and installed so that ends of springs remain parallel and all springs installed with adjustment bolts.
- K. Springs shall be sized to be non-resonant with equipment forcing frequencies or support structure natural frequencies.
- L. Refer to Vibration Isolation Schedule at the end of this Section.

3.2 SUPPORT OF PIPING

- A. Resilient diagonal mountings or other approved devices shall be provided as required to limit piping motion due to equipment startup or shut down, to a maximum of 1/8".
- B. Water piping hanger rod isolators shall contain a steel spring in series with a 1/4" acoustical neoprene pad within a steel box retainer. The hanger rod isolator assembly shall be rigidly supported from the spring sub assembly shall not contact the steel box retainer and clearances in the isolator design shall be capable of accepting a 15 degree misalignment in any direction from the vertical.
- C. The steel spring element of the assembly shall be designed to have a minimum surge frequency of 340 HZ and a minimum deflection of 3/4".
- D. Hanger rod isolators for steam and condensate piping including steam pressure reducing valve stations shall be supported by means of neoprene-in-shear mountings providing a minimum static deflection of 1/2".
- E. Where supplementary steel is required to support piping, the supplementary steel shall be sized so that maximum deflection between supports does not exceed 0.08" and shall be resiliently supported from the building structure with mountings as described above. Supported piping from the supplementary steel shall be rigidly suspended or supported.
- F. Pre-compressed type hanger rod isolators shall be provided for all water piping greater than 12" diameter and all supplementary steel supports. The pre-compression shall be factory set at 75% of rated deflection.

3.3 PIPING GUIDES

- A. Steel guides shall be welded to the pipe at a maximum spacing of 90°. The outside diameter of the opposing guide bars shall be smaller than the inside diameter of the pipe riser clamp in accordance with standard field construction practice. Each end of the pipe guide shall be rigidly attached to an all directional pipe anchor isolation mounting which in turn, shall be rigidly fastened to the steel framing within the shaft. See Detail on Drawings.
- B. The all directional pipe anchor isolation mountings shall consist of a telescoping arrangement of two sizes of steel tubing separated by a minimum of 1/2" thick heavy duty neoprene and canvas duct isolation pad. Vertical restraints shall be provided by similar material arranged to prevent vertical travel in either direction. The allowable load on the isolation material shall not exceed 500 psi.

3.4 ANCHORS

- A. The pipe riser clamp at anchor points, shall be welded to the pipe and to pairs of vertical acoustical pipe anchor mountings which in turn, shall be rigidly fastened to steel framing in the pipe shaft.
- B. Acoustical pipe anchor mountings shall be Type ADA Mason Industries, Inc., or as approved.

3.5 SUPPORTS

- A. Piping supports within shafts shall be provided with suitable bearing plates and two layers 1/4" thick ribbed or waffled neoprene pad loaded for 50 psi maximum. The isolation pads shall be separated with 1/4" steel plate.
- B. The isolation pads shall be Mason Industries Type W or approved equal.
- C. Piping isolation supports at the base of risers shall be two layers of 1/2" thick heavy duty neoprene and canvas duct isolation pad separated by 1/4" thick steel plate. Suitable bearing plates sized to provide a pad loading of 500 psi maximum shall be provided. The stanchion between the pipe and isolation support shall be welded to the pipe and welded or bolted to the isolation support. The isolation support shall be bolted to the floor slab with resilient sleeves and washers.
- D. All pipe support resilient materials shall be HL Mason Industries, Inc., or as approved.

3.6 PIPES CONNECTED TO EQUIPMENT ON SPRING ISOLATORS

- A. All pipes connected to equipment installed on spring vibration isolators, except sprinkler piping, shall be suspended or, supported by Type SPNM or Type SPNH isolators. Provide vibration isolation anchors and guides as specified elsewhere in this specification.
- B. The first isolator both upstream and downstream of equipment on springs shall have a static deflection equal to 1.5 times that of the equipment isolators, up to a maximum of 2 inches. The static deflection of the remaining pipe isolators shall be 1 inch.
- C. If pipes are supported on noise-critical structure, the 1.5 times spring deflection rule above applies throughout the pipe run.

3.7 PIPES CONNECTED TO EQUIPMENT ON NEOPRENE ISOLATORS

- A. Piping that is connected only to machinery installed on neoprene isolators shall be either supported from the floor on Type DDNM mounts or suspended from the structure on Type DDNH hangers.

3.8 PIPES WITH MULTIPLE CONNECTIONS

- A. Where a pipe run connects multiple items of equipment in the mechanical room the pipe isolators for the entire run shall be chosen to suit the connected equipment of greatest static deflection.

3.9 FLEXIBLE PIPING CONNECTORS

- A. Twin-sphere neoprene type flexible piping connectors shall be installed to connect piping to reciprocating or rotating equipment.

3.10 WIRING

- A. All wiring connections to plumbing equipment on vibration isolators (either spring or neoprene type) shall be made with a minimum 36 inch (1m) long flexible conduit in a 180 degree "U" shaped loop. This Contractor shall coordinate wiring connections with the Electrical Contractor.

3.11 FIELD QUALITY

- A. Contractor shall work in accord with best trade practices, shall fabricate and install all items in accordance with manufacturer's recommendations and Architect's directions and shall consult with trades doing adjoining work in order to provide an installation of first class quality.

3.12 ADJUSTMENT AND TESTING

- A. **SITE ACCESS:** During installation of equipment, Contractor shall arrange for access as necessary for inspection of isolation and noise control equipment by Architect and his representatives.
- B. **CONTRACTOR'S REPORT:** The vibration isolation vendor shall inspect and approve the installation of the vibration isolators and shall submit a report to the Owner, which verifies that all of the isolation equipment has been properly installed and that the installation is in full conformance with the specification. The report shall record the vibration isolator identification and model or type. For isolators containing steel springs the report shall also record the size and uncompressed height, design static deflection and measured static deflection of the isolators provided.
- C. **CONSULTANT'S INSPECTION**
 - 1. Upon completing installation and adjustment for suitable operation of all work specified under this section, the Contractor shall notify the Architect in writing. The letter shall certify that all work specified under this section is complete, operational and adjusted in every respect and that all work is ready for the completion checkout. A copy of the air balancing report and the vibration isolation report shall accompany the notification letter.

2. Upon notification of completion, Architect will schedule an inspection by the Acoustics Consultant, who will measure the background noise level with all Mechanical Systems running.
3. For each inspection, Contractor shall perform such functions as are necessary for inspection of the equipment. Background noise level testing must be carried out during late-night hours when ambient noise from outside is at a minimum and the site is otherwise not occupied and no work is under way. Contractor shall turn on and off any and all mechanical equipment during such background noise level testing.

3.13 GUARANTEE

- A. If, in the actual installation, any equipment fails to meet the noise or vibration control requirements specified herein, that equipment shall be corrected or replaced without claim for additional payment, inclusive of all labor and material costs. Such corrective measures shall be done within a time schedule specified by the Owner.

VIBRATION ISOLATION SCHEDULE FOR PLUMBING EQUIPMENT				
EQUIPMENT	BASE TYPE	ISOLATOR TYPE	STATIC DEFLECTION	REFERENCE DETAIL
Base-mounted pumps (less than 3 HP)		DDNM	.4"	
Piping		Isolation as per specification	2" default	

END OF SECTION 22 05 50

SECTION 22 05 95 - SYSTEM TESTING, CLEANING & START-UP

PART 1 - GENERAL

1.1 SCOPE:

- A. This work includes cleaning the various fluid systems, pressure testing to insure tightness, and start-up of the various systems to prove their operational capability.

PART 2 - PRODUCTS

2.1 CLEANING OF SYSTEMS:

- A. Clean all piping systems, equipment and accessories (especially pumps, valves, flange faces, gauges, etc.) of cutting chips and foreign matter while installing.

2.2 GENERAL:

- A. Be careful to provide all sight glasses, control valve, pumps and any items that could be damaged by foreign material with 40 mesh screen on the inlet side or bypass, or remove such items.
- B. Clean out all low velocity areas where dirt accumulated.
- C. Clean all strainers and dirt legs.

2.3 START-UP AND TEST:

- A. Each system shall be started-up and a preliminary test made as follows:
 - 1. This contractor shall make trial runs of each piece of equipment furnished by him. This contractor shall provide all oil, grease and other lubricants for the operation of all equipment until acceptance. This contractor shall be held responsible for all damage to bearing while the equipment is being operated by him up to date of acceptance of the equipment, and for a period thereafter as per the general building warranty. The subcontractor shall be required to protect all bearings during installation and shall thoroughly grease steel shafts to prevent corrosion.
 - 2. The contractor shall align each shaft and adjust all pulleys to run substantially vibration free. Where equipment cannot be so adjusted by the contractor, the manufacturer shall provide a machinist or serviceman to make these adjustments. Vibration free is construed to mean that rotating machinery shall not exceed a self-excited vibration velocity of 0.10 inches per second in any direction when measured with a vibration meter on the bearing caps of the machine.
 - 3. Belts shall be checked for alignment and tightened to proper tension.
 - 4. Overload elements in motor starts shall be checked and proper elements provided as required for the motor full load amp rating.

5. Glands, seals, etc. shall be examined and properly adjusted.
 6. Air vents shall be bled.
 7. Equipment shall be started per manufacturer's instructions and run in.
 8. Read amperage and voltage on each motor the first time it is started and check direction of rotation.
- B. Run an operating test on each piece of equipment. The tests shall be sufficient to show that the equipment has been run and observed and shall include the following:
1. Volts and amps on each motor.
 2. Results of preliminary tests shall be submitted before test and balance subcontractor commences his work.

END OF SECTION 22 05 95

SECTION 22 90 00 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS - BUILDING:

- A. Submit as-built drawings as required by General Conditions and obtain written receipt from engineer.

1.2 DEMONSTRATION OF COMPLETE PLUMBING SYSTEMS:

- A. The following systems shall be put into operation by the plumbing sub-contractor furnishing the equipment, and operated for the length of time required to prove proper operation and control.

- 1. Cold Water
- 2. Hot water systems/recirculation systems
- 3. Waste
- 4. Storm
- 5. Lab Gases
- 6. Natural Gas Piping

- B. Thoroughly demonstrate and instruct (3) three designated representatives of the Owner in the care and operation of all the plumbing systems and equipment furnished and installed in the contract.

- C. Manufacturers of certain equipment specified herein shall provide technically qualified factory representatives to train the Owner's representative in the care and maintenance and operation of their product. This instruction and service of the factory representative shall be furnished as specified elsewhere in the specifications. This time is in addition to what is specified above and will not be counted as part of this contractor's instructions.

- D. The time and place of all training shall be coordinated and scheduled by the contractor at the convenience of the Owner and as approved by the architect.

- E. Submit letters signed by the owner's representatives attesting to the satisfactory completion of all instructions.

1.3 OWNER'S RIGHT TO TEST SYSTEM:

- A. Should, in the opinion of the architect, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this contract, the right is reserved for the owner and architect to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the owner. If the tests indicate a deficiency in equipment capacity or performance, the contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the owner and the architect.

1.4 OPERATING AND MAINTENANCE MANUALS:

- A. The contractor shall carefully prepare an operating instructions and maintenance manual for each plumbing system, including all equipment furnished. The manual shall be submitted to the engineer for approval before final inspection and acceptance is made.
- B. The form in which the operating maintenance manual is to be presented shall be subject to approval by the architect. Three copies of the manual shall be provided.
- C. The following items together with any other necessary and pertinent data shall be included in the manual. This list is not necessarily complete and is only to be used as a guide.
 - 1. Suggested settings of all control and switches for normal operation with description of control and its location.
 - 2. A check list for periodic maintenance of all equipment.
 - 3. As-built wiring, interlock, and control diagrams for the equipment, with color coding shown on wiring and interlock diagrams.
 - 4. Part numbers of all replaceable items.
 - 5. Manufacturer's cuts and rating tables for all equipment.
 - 6. Oiling, lubricating and greasing data.
 - 7. Complete electrical load data from operation tests.
 - 8. Test data on all equipment
 - 9. Belt sizes, types, and lengths
 - 10. Serial number of all principal pieces of equipment
 - 11. Valve tag schedule
 - 12. Manufacturers', suppliers' and contractors' names, addresses and telephone numbers.

1.5 VALVE TAG SCHEDULE:

- A. Copies of the valve tag schedule and wiring diagrams shall be framed under glass and posted in the equipment room.

1.6 WARRANTIES:

- A. Deliver to Owner all warranties, etc., and obtain written receipts.

1.7 OBSERVATION REPORTS:

- A. During construction period the engineer will issue observation reports. These items shall be completed before engineer will approve next application for payment. Final punch list work shall be complete before acceptance.

1.8 FINAL INSPECTION AND ACCEPTANCE:

- A. The architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
 - 1. Submit a list of uncompleted items, if any, and advise when the items will be done.

2. Clean, test, and adjust all systems and equipment.
3. Lubricate all motors.
4. Complete all items on architect's or engineer's pre-final punch list.
5. Final inspection and tests of the completed construction shall be performed in the presence of the architect or his representative and shall be at such times as are convenient to the architect. Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for these tests shall be furnished by the contractor at his own expense.
6. Final Clean-up. During construction the contractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises to remove all evidence of his work. In addition, upon completion of construction he shall clean, wash, and/or polish all fixtures, equipment, and exposed material and leave them bright and clean.

END OF SECTION 22 90 00

SECTION 23 01 00 - GENERAL PROVISIONS - MECHANICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. The work to be done under Division 23 contract shall include the furnishing of all labor, materials, equipment, and services necessary for and reasonably incidental to the proper completion of all work as shown on the plans and herein specified, excepting only work materials specified or noted as being furnished or installed by others.
- B. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotation.
- C. The HVAC Contractor may hereinafter also be referred to as "This Contractor", "Mechanical Contractor", "MC", or "Division 23 Contractor".
- D. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule or architectural drawings for material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.

1.2 WORK INCLUDED:

- A. The HVAC Contractor shall be responsible for including all labor, accessories, tools, equipment and material required to completely execute installation of the entire heating, ventilating and air conditioning system as shown on the drawings and as specified. Work under the Mechanical contract shall include but not be limited to the furnishing, unloading, handling distribution, setting and installation of all components required for the following systems:
 - 1. Air Conditioning System
 - 2. Heating System
 - 3. Ventilation System
 - 4. Air Distribution System
 - 5. Insulation
 - 6. Temperature Control
 - 7. Testing and Balancing
 - 8. Condenser Water System
 - 9. Hot Water System
 - 10. Condensate Drain System
 - 11. Other Work as Herein Specified

1.3 RELATED WORK WHICH IS A PART OF SECTION 23 01 00:

- A. All work done under this section of the specification is subject to the Architect's instructions to bidders, general conditions and their corresponding supplements, and acoustic supplement specification sections.
- B. Refer to the supplementary general conditions of these specifications for temporary services and facilities that shall be provided.

1.4 DEFINITIONS:

- A. "Piping": Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents, and items customarily required in connection with the transfer of fluids.
- B. "Ductwork": All air delivery, recirculation and exhaust ducts, whether of sheet metal or other material, and includes all connections, accessories, and appurtenances necessary for and incidental to a complete system.
- C. "Provide" (P): Furnish and install complete ready for use.
- D. "Furnish" (F): Purchase and deliver to the project site complete with every necessary appurtenance and support.
- E. "Install"(I): Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation of the proper location in the project.
- F. "Concealed": Embedded in masonry or other construction, installed behind wall furring, within double partitions of hung ceilings, in crawl spaces, in shafts.
- G. "By Other Trades": Shall mean by persons or parties who are not anticipated to be the HVAC Contractor working together with the general contractor. In this context the words "by other trades" shall not be interpreted to mean not included in the overall contract.

1.5 ABBREVIATIONS:

AD	Automatic Damper (Motor Operated)/Access Door
AFF	Above Finish Floor
AMP	Amperes
AP	Access Panel
AV	Air Vent
BO	By Others
BOW	Baked On White
CC	Cooling Coil
CD	Ceiling Diffuser
CHWR	Chilled Water Return
CHWS	Chilled Water Supply
CL	Ceiling
CONTR	Contractor
CP	Circulating Pump
CS	Condenser Water Supply
CR	Condenser Water Return
DB	Decibels
DIS.SW	Disconnect Switch
DN	Down
EA	Exhaust Air
EF	Exhaust Fan
ELEC	Electrical
E/S	Emergency Stop Switch
F	Furnish or Filter
FD	Floor Drain/Fire Damper

FL	Floor
G	Grille
HC	Heating Coil
I	Install
NC	Noise Criteria
OBD	Opposed Blade Damper
P	Provided (Furnished & Installed)
PH	Phase
PLBG	Plumbing
PRV	Pressure Reducing Valve
RA	Return Air
RF	Return Fan
SA	Supply Air
SD	Strip Diffuser
SF	Supply Fan
SP	Static Pressure
T	Transfer/Thermostat
UG	Underground
UH	Unit Heater
VAV	Variable Air Volume
Ø or PH	Current Phase

1.6 INTERPRETATION OF CONTRACT DOCUMENTS:

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complementary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to a specific element of work, take precedence over the specifications where they may conflict.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted.
- D. The drawings of necessity utilize symbols as schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.

- G. Information as to the general construction shall be derived from structural and architectural drawings and specification only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.7 DELINEATION OF WORK:

- A. The HVAC contractor is required to supply all necessary supervision and coordination of information to any others who are performing work to accommodate HVAC installations. Where the mechanical contractor is required to install items which he does not purchase, he shall include for such items:
 - 1. The coordination of their delivery.
 - 2. Their unloading from delivery trucks driven in to any designated point on the property line.
 - 3. Their safe handling and field storage up to the time of permanent placement in the project.
 - 4. The correction of any damage, defacement or corrosion to which they may have been subjected.
 - 5. Their field assembly and internal connections as may be necessary for their proper operation.
 - 6. Their mounting in place including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt them to architectural and structural conditions.
 - 7. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.
- B. Items which are to be installed but not purchased as part of the work of the HVAC contractor shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The work under this contract shall include all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.
- C. The specifications for the overall construction delineate various items of work under separate section headings. The list below set forth this delineation to the extent that it affects the HVAC work category. In the absence of more detailed information, this list shall be taken as a specific instruction to the HVAC contractor to include the work assigned to him. Indications that each contractor is to perform the work means that it is to perform the work for its own accommodation only, except as specifically noted otherwise.

D. This HVAC contractor is required to supply all necessary supervision and coordination of information to any others who are supplying work to accommodate his installation.

"P" indicates Provide "F" indicates Furnish "I" indicates Install			
Item	"General"	"Plbg"	"HVAC"
Motors for mechanical equipment	_____	_____	<u> P </u>
Motor controls for mechanical equipment	_____	_____	<u> P </u>
Power wiring for mechanical equipment	Refer to Electrical Sections		
Hoisting	_____	_____	<u> P </u>
Rigging	_____	_____	<u> P </u>
Cutting and patching	_____	_____	<u> P </u>
<u>EXCEPTION:</u> Cost where due to late installation or improper coordination of work is the responsibility of the delinquent contractor. Locations shall be approved by structural engineer.			
Framed slots and openings in walls, decks and slabs	<u> P </u>	_____	_____
<u>EXCEPTION:</u> Coordination drawings are required from HVAC contractor.			
Sleeves through non-membraned slabs, decks and walls	_____	_____	<u> P </u>
Sleeves through membraned slabs, decks and walls	_____	_____	<u> P </u>
Fireproof sealing of excess opening in slabs, decks and fire rate walls	_____	_____	<u> P </u>
Excavation and backfill of trenches	_____	_____	<u> P </u>
<u>EXCEPTION:</u> Drawings delineate exceptions.			
Keeping trench excavations free from water during construction	_____	_____	<u> P </u>
<u>EXCEPTION:</u> The general contractor shall be responsible for keeping the entire site free of surface water.			
Fastenings	_____	_____	<u> P </u>

"P" indicates Provide "F" indicates Furnish "I" indicates Install			
Item	"General"	"Plbg"	"HVAC"
Supports			<u>P</u>
Concrete foundations, pads & bases			<u>P</u>
Field touch-up painting damaged shop coats			<u>P</u>
Finish painting of exposed work and work on roof	<u>P</u>		
<u>EXCEPTION:</u> Painting of equipment, piping, etc. in mechanical spaces provided by HVAC contractor. The HVAC contractor shall prime all exposed ductwork, piping, etc. in finished spaces and equipment on roof.			
Exterior wall louvers	<u>P</u>		
<u>EXCEPTION:</u> Drawings and specifications delineate exceptions.			
Finished wall and ceiling access doors, panels and support frames	<u>I</u>		<u>F</u>
<u>EXCEPTION:</u> HVAC contractor shall furnish and locate all required access doors to the installing trade. (Refer to Architectural specifications for type.)			
Removal of spray on fire proofing from mechanical equipment, ductwork, hangers etc.	<u>P</u>		
Rubbish removal			<u>P</u>
<u>EXCEPTION:</u> Where one trade furnishes and another installs, the installing trade shall remove the shipping and packing material which accumulate.			
Special tools for equipment maintenance			<u>P</u>
Piping and associated work outside of the building line			<u>P</u>

1.8 STANDARDS AND CODES:

- A. Nothing in this specification shall be interpreted to conflict with any State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction."

- C. All equipment with electrical components shall bear the UL label, or be certified by an independent laboratory approved by SC OSE.
- D. The following minimum standards apply wherever applicable:

ANS	American National Standards
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
SMACNA	Sheet Metal and Air Conditioning Contractors National Assoc., Incorporated
AGA	American Gas Association
ASA	American Standards Association
NBFU	National Board of Fire Underwriters
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning, Engineers, Inc.

1.9 INSPECTION AND COOPERATION:

- A. All work shall be done under the periodic observation of and to the complete satisfaction of the Architect. No deviations from the Drawings and Specifications will be allowed without prior written approval of the Architect.
- B. The HVAC contractor shall cooperate with the other contractors to allow for the installation of their work as well as his own.
- C. The HVAC contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this contractor without regard for other work, or if a conflict results, must be changed if directed by the Architect or Engineer without additional cost to Owner or his agents.
- D. Relocation of equipment, ductwork, piping, system connections or rough-in locations up to ten feet (10') in any direction, if necessary, shall be done at no additional cost to the Owner or his agents upon notification, or as determined by the preparation of fabrication or coordinated shop drawings, prior to installation.
- E. All concealed work shall be inspected by the Architect or his appointed representative before being concealed. HVAC contractor shall call for inspection at least two (2) work days before concealment.
- F. The Architect shall have the right to inspect the work whenever advisable in his judgment. The HVAC contractor shall have a representative present at each inspection and shall give such assistance as may be required.
- G. Recommendations made by the Architect shall be promptly carried out and all unsatisfactory material and workmanship replaced at once to the Architect's satisfaction at the HVAC contractor's expense.
- H. HVAC contractor shall be responsible for hoisting of all materials and equipment furnished under as part of his portion of the work in accordance with all State and Federal rules and regulations.

1.10 TEMPORARY SERVICES AND FACILITIES:

- A. Refer to general requirements for temporary services and facilities that shall be provided.

1.11 UNIT PRICES:

- A. Refer to general requirements relative to "Add" or "Deduct" prices relative to this contract.

1.12 SUBMITTALS:

- A. LIST OF MANUFACTURERS: Within twenty days following award of contract, the HVAC contractor shall submit the required information pertaining to the equipment and materials he will be furnishing, commencing with the list of manufacturers for approval by the Engineer. Following up in short order shall be the shop drawings and other documents. The Owner and his representatives reserve the right to reject as unacceptable any items for which, in their judgment, they have not been allowed adequate lead time in which to investigate suitability, or their experience has proved the service or equipment unsatisfactory.

- B. SHOP DRAWINGS:

1. Prior to purchasing any equipment or materials, the approved list of the manufacturers shall be returned by the Engineer to the HVAC contractor.
2. Shop drawings shall be submitted conforming to the requirements stated in supplementary conditions and Division 01 for the items indicated throughout the following specifications:
3. Documents will not be accepted for approval unless:
 - a. They comply with the requirements of the supplement to the General Conditions
 - b. They include complete information pertaining to appurtenances and accessories.
 - c. They are submitted as a package where they pertain to related items.
 - d. They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not applicable, and are marked with pertinent specification paragraph number.
 - e. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.
 - f. The submittal is stamped approved by the HVAC contractor and contain no other markings.
4. Approval of shop drawings does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

1.13 FABRICATION DRAWINGS:

- A. Prior to assembling or installing the work, the following shall be submitted to the Architect by the HVAC contractor:

1. Scaled drawings indicating insert and sleeve locations. The background shall include the structural framing plan.
 2. Scaled CADD drawings (1/4" or larger) showing dimensional locations in plan and elevation of all piping, cable tray, conduit, sprinkler systems, ductwork and equipment. Supervisor or foreman of the Fire Protection, Plumbing, Mechanical and Electrical installing trade shall review drawings for coordination and initial as a sign of approval, each drawing he reviews.
 3. Scaled CADD drawings (1/4" or larger) showing dimensional locations in plan and elevation of all piping, ductwork and equipment in equipment rooms.
- B. The following general rules shall apply to the proceeding items:
1. The sprinkler piping will generally be run dead level, without pockets, so the piping system is drainable. The HVAC contractor shall be furnished copies of a "CADD" disc and the Fire Protection shop drawings for use in preparing the coordinated duct drawings.
 2. Storm drain piping and sanitary waste piping, in which the grade must be maintained, shall have first priority. Ducts and other pipes shall be offset to avoid them.
 3. Service piping (water, gas, air, ultrapure water, etc.) shall generally be run below ductwork so they will be accessible for service and modifications. The pipes will be offset as required to avoid interfering with access to duct access panels, dampers, etc.
 4. The HVAC contractor shall be furnished copies of a "CADD" disc of the plumbing piping layout.
 5. Ducts will have next priority. Ducts will be offset as required to avoid pipes and cable trays.
 6. Where pipes of different trades conflict, such as domestic water vs. chilled water, the smaller pipe shall be offset.

1.14 AS-BUILT DRAWINGS:

- A. The HVAC contractor shall provide one set of updated coordination mechanical plans and set of CADD discs to the Engineer for his preparation of close out documents. The updated plans shall indicate correct location of all equipment, piping, etc. as installed on project.
- B. The drawings shall provide an accurate and complete record of the work as installed, and shall be presented at each monthly meeting for review by the architect.

1.15 RECORD DRAWINGS:

- A. Purchase and maintain at the job site a complete and separate black line set of prints of the approved working Drawings on which to accurately indicate daily progress by coloring materials and apparatus as installed. Schedules shall be modified to reflect data consistent with that of the installed equipment. Clearly show all changes to work as a result of change orders, instruction issued by the Architect or conditions encountered in the field. Accurately indicate the locations, size, type and elevation of new utilities and their relationship to existing utilities.
- B. The marked-up and colored-in prints will be used as a guide for determining the progress of the work installed. They shall be inspected at the architect's or construction manager's discretion and shall be corrected immediately if found inaccurate or incomplete. Requisitions for payment may not be approved until the drawings are accurate and up-to-date.
- C. The mechanical contractor shall provide one set of marked plans to the Engineer for his review and approval of record drawings. The approved plans shall be returned to the contractor for his preparation of documents using AutoCAD version 14 or later to indicate correct location of all equipment, piping, etc. as installed on project.
- D. The drawings shall provide an accurate and complete record of the work as installed.

1.16 UTILITY INSTALLATION COSTS:

- A. All required auxiliary devices shall be provided by the HVAC contractor. All associated costs billed by the Utility Departments shall be included in this contract.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS:

- A. All materials used in this work shall be new unless otherwise noted. All materials used on this project shall be listed and labeled by one of the third party agencies which have been approved by the South Carolina Building Code Council to safety test and label electrical and mechanical equipment. Any material installed that is not labeled shall be subject to a field evaluation by one of these approved agencies, at the contractor's expense, if requested by the authority having jurisdiction or the engineer. Any item not approved by the agency shall be replaced by the contractor at his expense. It shall be the contractor's responsibility to verify that materials specified or used on the project are labeled.
- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible. It is the intent of the specifications that wherever manufacturers of a product are specified any substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction such as lesser heat exchange surface, etc.). Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance. In many cases equipment is oversized to allow for pick-up loads which cannot be delineated under the minimum performance.

- C. Substituted equipment where permitted or approved, must conform to space requirements, whether approved or not or shall be replaced at the HVAC contractor's expense. Any modification of related systems as a result of substitutions shall be made at the HVAC contractor's expense.
- D. Note the approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not assure that the Engineer, Architect, or any other Owner's Representative, attests to the dimensional accuracy or the ability of the material or equipment involved or the mechanical performance of the equipment.

2.2 SUBSTITUTION OF SPECIFIED MATERIALS:

- A. It is the purpose of this specification not to exclude competition between manufacturers of similar equipment.
- B. Where items are specified as "or approved equivalent" prior approval must be obtained from the Engineer. Said approval does not intend to obligate the Engineer in the event shop drawings submitted do not indicate equality of materials, workmanship or function and the right to reject substitutes shall remain the prerogative of the Engineer.
- C. In all cases regardless of method of submission, the HVAC contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed. Minor modifications to suit standard manufactured items are acceptable if approved by Engineer.
- D. Should contract documents fail to describe particular materials or goods to be used, then it shall be the duty of HVAC contractor to inquire of Engineer as to what is to be used and to supply it at HVAC contractor's expense.
- E. HVAC contractor shall promptly remove, at own expense, rejected materials from site of work.
- F. When material has been approved, no change in brand or make will be permitted without approval of Engineer.

2.3 NAMEPLATES:

- A. All items of operation equipment used on the project shall be provided with a nameplate mounted in a conspicuous place on the unit. Plate shall be embossed metal or stamped metal securely fastened to the unit.
- B. The plate shall contain the following information:
 - 1. Manufacturer's name and address.
 - 2. All approval stamps, AGA, UL, Etc. as hereinafter specified.
 - 3. Complete capacity and operating data as approved by Engineer
 - 4. Motor Characteristics
 - 5. Serial number and code numbers
 - 6. Date of manufacturer

2.4 V-BELT DRIVES:

- A. Shall be rated for not less than 150 percent of the motor nameplate horsepower. Motor sheaves for motors 50 hp and under shall be adjustable to provide a plus or minus 20 percent speed variation from designed operating rpm. All V-belt drives on motors over 1/2 hp shall have a minimum of 2 belts. Belt drives shall be isolated by an approved expanded metal belt guard or by enclosing within the unit housing. Where belt guards are used, they shall be fabricated so as to allow a plus or minus 6 " variation in center line distances between driver and driven shafts. Access to ends of shafts shall be provided to allow for rpm readings. Fixed sheaves shall be provided on all motors over 50 hp with allowance for 1 change of sheaves.

2.5 APPROVED MANUFACTURER'S LIST:

SECTION	ITEM	MANUFACTURERS			
230513	Motors	Westinghouse	Wagner	Century	GE
230519	Thermometers	Weksler	Palmer	Trerice	Ashcroft
230519	Gauges	Ashcroft	Palmer	Trerice	Weksler
230523	Valves	Hammond	Nibco	Fairbanks	Stockham
230523	Circuit Setters	B&G	Taco	Armstrong	
230529	Vibration Isolation Hangers	Kinetics Noise Control	Mason Industries	EFI Concepts	
230548	Seismic and Vibration Isolations	Kinetics Noise Control	Mason Industries	EFI Concepts	Anvil
230700	Insulation	Knauf	Owens-Corning	Armstrong	John Mansville
230900	Controls	Siemen's. Provided by Control Management Inc.			
230920	Variable Frequency Drives	ABB	Danfoss	Yaskawa	
232113	Pipe	Wheatland Tube	Allied Tube	Northwest Pipe	
232113	Fittings	Tube-Turn	Grinnel	Weldbend	Cerro Tube
232115	Sleeves	Pipe Shields	R&S Mfg	Clow	
233200	Sound Attenuators	Kinetics Noise Control	Ruskin	EFI Concepts	
233300	Dampers – All	Nailor Industries	Ruskin	Greenheck	
233413	Make Up Air Unit	Captive Aire	Greenheck	Cook	
233413	Exhaust Fans	Greenheck	Acme	Cook	Penn Barry
233423	Fans	Loren Cook	Penn Barry	Greenheck	Acme
233600	Air Terminal Units	Krueger	Trane	Nailor	
233713	Air Distribution Devices	Metal-Aire	Price	Titus	Nailor
236850	Split System	Mitsubishi	Trane	LG	Daikan
237070	Rooftop Units	Trane	JCI	Carrier	
238238	Unit Heaters	Trane	Markel	Chromolox	Electromode
238238	Electric Unit Heaters	Berko	Indeeco	Trane	
238240	Electric Wall Heaters	Berko	Indeeco	Trane	

PART 3 - EXECUTION

3.1 WORKMANSHIP:

- A. Workmanship shall be of best quality. Good appearance of finished work shall be of equal importance with its mechanical efficiency. No make-shifts shall be permitted anywhere in work and all portions of work shall be so laid out and installed that work as a whole is of uniform quality and appearance.

3.2 PROTECTION OF EQUIPMENT:

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping and ductwork shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping and ductwork.
- D. This HVAC contractor shall be responsible for the work damaged by him in executing his contract. Any work damaged by the HVAC contractor shall be replaced by him and placed in perfect condition without extra cost.

3.3 CONTIGUOUS WORK:

- A. If any part of the HVAC contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, the contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the HVAC contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions.

3.4 CERTIFICATES OF INSPECTION AND APPROVAL:

- A. Upon completion of work, HVAC contractor shall furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.5 SLEEVES AND OPENINGS:

- A. All sleeves and openings required shall be located and provided by the HVAC contractor for his portion of the work. Core drilling for missed sleeves shall be provided by the delinquent contractor.
- B. In order to minimize liquid leakage or transfer of air between floors, it is the intent that pipe penetrations of floors (except in plumbing chases) be held to a minimum. Where it is necessary to penetrate floors, the pipe shall pass through sleeves set in the concrete, and the space between the pipe and sleeve shall be caulked to make it air tight.

3.6 ACCESS TO EQUIPMENT AND VALVES:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.

- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.
- C. Where devices are to be concealed in walls or above nonremovable ceilings, the HVAC contractor shall furnish the required access panels to the GC for installation for their respective equipment.
- D. Size of panels shall be 12" x 12" square for all wall panels and 24" x 24" for ceiling panels.

3.7 COORDINATION:

- A. The HVAC contractor is cautioned that portions of the building have an unusually high quantity of piping, ducts, conduits, and other mechanical equipment, and space is limited. The HVAC contractor shall offset pipes as required to avoid interference at no additional cost to the Owner. Generally pipes in which grade must be maintained, such as waste and storm drain piping, and sprinkler piping, shall have first priority. Other pipes shall be offset as required to avoid those items. The HVAC contractor will be required to prepare coordinated shop drawings. The Plumbing Contractor will be furnished copies of these drawings and shall use them in determining pipe routing.
- B. The HVAC contractor will make the basic duct drawings and send copies to the plumbing and electrical contractors. Within 30 days after receiving the copies, the contractors shall return them to the HVAC contractor, marked to show how plumbing pipes, conduits, etc. cross the ducts, and with suggested routing of pipe and conduit, etc. elevation for each. The HVAC contractor will use this information plus similar information received from other contractors to prepare the finished coordination drawings.
- C. The HVAC contractor shall provide manufacturers installation drawings as shipped with equipment, field working and location drawings, coordination drawings, wiring diagrams as required to show information required for information and coordination of the work for other trades. This includes locations of equipment, sleeves, foundations, curbs, pipe connections, wiring connections, etc. These drawings shall be provided in advance of work in the area so that the necessary coordination can be done at the proper time. The drawings shall be submitted to the A/E for record only, and other contractors involved in the work for coordination.
- D. The HVAC contractor shall coordinate the work of his trade and other trades in order that interference between fire protection, plumbing, mechanical, electrical, architectural and structural work will be avoided. Piping, ducts, conduits, etc. shall be kept as close as possible to ceiling, walls, columns, etc. in order to take up the minimum amount of space; and all offsets, fittings, etc. required shall be furnished without additional cost to the Owner. In case interferences develop, the Engineer will decide which equipment shall be relocated regardless of which was first installed.
- E. Minor changes required by Owner, and any incidental changes required to meet structural conditions or to match trim etc. shall be made by this contractor without extra cost to the Owner. Generally, all pipes, and conduits except those in the equipment room and in other locations specifically designated on the plans shall be run concealed in furrings and chases. In the event that it is necessary to expose these items in finished areas, this shall be called to the Architect's attention before proceeding with the work.

- F. The HVAC contractor shall cooperate closely with the General Contractor and all other contractors on the job in order that the job will progress smoothly to its completion. He shall lay out his pipe in advance of pouring floors, or installing walls, shall provide to the General Contractor the location and size of any openings he may require, and shall furnish for the installation by the General Contractor any sleeves, forms, inserts, or hangers required for his work. In the event of failure to do these things at the proper time, or improper location of the required items, the cutting and patching required to rectify the errors shall be done by the HVAC contractor who installed the original material being cut but shall be paid by the contractor at fault, as determined by the Engineer, at no additional cost to the Owner.
- G. All equipment shall be installed with sufficient access and clearance for maintenance, repairs, and replacement. In the event that it appears necessary to install equipment without proper access or clearance, the work shall be stopped until written permission is received from the Engineer to install the equipment. Pipes shall be installed in such a way as to allow maximum headroom where pipes are in occupied areas. Valves shall be located in such a position that they are easily accessible and so that the valve wheels can be easily turned to full open or full closed positions.

3.8 CHASES, CUTTING AND PATCHING:

- A. In new construction, chases in walls for any work to be installed by these HVAC contractor will be provided by the general contractor provided full information as to the location and size of such chases and the necessary frames for openings is given to him by this contractor in such time as to cause no delay in the general contractor's work.
- B. If this contractor should neglect to furnish the required information and by reason of his neglect chases and openings are not provided, the HVAC contractor shall, at his own expense, cut the required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.
- C. The cutting of chases, openings, or holes in floors and ceilings shall be done in a manner as not to endanger the stability of the structure or any part thereof. The HVAC contractor shall not in any case cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs resulting from cutting shall be under the supervision of the Superintendent of the General Contractor.

3.9 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the architect for clarification and resolution.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.10 JOB CONDITIONS:

- A. Safety: Observe all required safety regulations and the manufacturer's warnings and instructions during the storage, handling and application of materials.
- B. Necessary precautions shall be taken to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion or other harm.

- C. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at the end of each day's work, in accordance with all applicable federal, state and local codes.

END OF SECTION 23 01 00

SECTION 23 05 53 - MECHANICAL IDENTIFICATION AND PAINTING

PART 1 - GENERAL

1.1 SCOPE:

- A. All exposed pipe, hangers, and equipment installed by HVAC contractor shall be painted unless it has a factory finish or is noted otherwise. Exposed chromeplated brass, stainless steel, or plastic piping will not be painted.
- B. Type of identification devices specified in this section include the following:
 - 1. Plastic Pipe Markers
 - 2. Plastic Tape
 - 3. Valve Tags
 - 4. Valve Schedule Frames
 - 5. Engraved Plastic-Laminate Signs

1.2 QUALITY ASSURANCE:

- A. Manufacturers: Firms regularly engaged in manufacturer of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. ANSI Standards: Comply with ANSI A13.1 for lettering size, colors, and viewing angles of identification devices.

1.3 SUBMITTALS:

- A. Product Data: Submit product specifications and installation instructions for each identification material and device required.
- B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.
- C. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags," in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 01.

PART 2 - PRODUCTS:

2.1 PLASTIC PIPE MARKERS:

- A. General: Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, color-coded, plastic-sheet pipe markers, complying with ANSI A13.1.
- B. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:

1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 2. Adhesive lap joint in pipe marker overlap.
 3. Laminated or bonded application of pipe marker to pipe (or insulation).
 4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1-1/2".
- C. Large Pipes: For external diameters of 6" and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
1. Laminated or bonded application of pipe marker to pipe (or insulation).
 2. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
 3. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer's standard stainless steel bands.
- D. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
- E. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.2 PLASTIC TAPE:

- A. General: Manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.
- B. Width: Provide 1-1/2" wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6", 2-1/2" wide tape for larger pipes.
- C. Color: Comply with ANSI A13.1, except where another color selection is indicated.

2.3 VALVE TAGS:

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener. Provide 1-1/2" diameter tags, except as otherwise indicated.
- B. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

2.4 VALVE SCHEDULE FRAMES:

- A. For each page of the valve schedule, provide a glazed display frame, with screws for removable mounting on walls. Provide frames of rigid plastic or metal, with plastic glazing. Install in mechanical room.

2.5 ENGRAVED PLASTIC-LAMINATE SIGNS:

- A. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.
- C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6 LETTERING AND GRAPHICS:

- A. Coordinate names, abbreviations and other designations used in mechanical identification work with corresponding designations shown pre-existing, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturer's or as required for proper identification and operation/maintenance of mechanical systems and equipment.
- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 1, AHU-1).

2.7 PAINT:

- A. All products shall be in accordance with the specifications for painting in the general contract.

PART 3 - EXECUTION:

3.1 GENERAL:

- A. Any equipment shipped with a factory applied finish shall be touched up to repair any damage to the finish so that it is the same as new.
- B. In the mechanical equipment rooms the HVAC contractor shall be responsible for painting all piping, equipment, and accessories installed under their respective contract.
- C. In other parts of the buildings items which are in place in finished areas when general building painting is done will be painted by the General Contractor. Items installed after painting is completed shall be painted by the HVAC contractor, as directed by the architect.
- D. All exposed nongalvanized ferrous metal hangers and miscellaneous metal used in connection with the HVAC systems shall be painted with two coats of enamel.

- E. All exposed piping including insulated piping, insulated by HVAC contractor shall be painted two coats of oil paint. Elastomeric pipe insulation shall have two coats of enamel of the type recommended by the insulation manufacturer.
- F. Do not field paint exposed copper pipe, brass valves, or brass trim on iron body valves, or machinery or equipment that has a factory applied finish unless otherwise specified. Do not paint plastic pipe.
- G. Painted pipes which are buried in earth, shall be allowed to dry before backfilling.
- H. All paint shall be delivered to the project in unbroken containers. Containers shall be labeled to indicate color, directions for use, manufacture, and date of manufacturer. Directions for use of the paint shall be carefully followed in the mixing and general application. All paint shall be applied under dry and dust free conditions. Sufficient time shall elapse between paint coats to permit satisfactory recoating. Once started all painting shall be completed without delay.

3.2 DUCTWORK IDENTIFICATION:

- A. General: Identify air supply, return, exhaust, intake and relief ductwork with plastic signs and arrows, showing ductwork service and direction of flow, in black or white (whichever provides most contrast with ductwork color).
- B. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures (shaft, underground or similar concealment), and at 50' spacing along exposed runs.
- C. Access Doors: Provide plastic-laminate type signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety in procedural information.
- D. Concealed Doors: Where access doors are concealed above acoustical ceilings or similar concealment, plasticized tags may be installed for identification in lieu of specified signs, at Installer's option.

3.3 PIPING SYSTEM IDENTIFICATION:

- A. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), exterior non-concealed locations and above removable acoustical ceilings.
 - 1. Near each valve and control device.
 - 2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - 3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - 4. At access doors, manholes and similar access points which permit view of concealed piping.

5. Near major equipment items and other points of origination and termination.
6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
7. On piping above removable acoustical ceilings.

3.4 PAINT SCHEDULE:

- A. All exposed equipment, pipes, conduits, or other appurtenances shall be painted by this sub-contractor with materials and application as specified in the general contract specifications and as directed by the architect.
- B. All concealed pipe covering shall be identified by colored bands and legends. The direction of flow shall be indicated by flow arrows.
- C. All exposed pipe covering shall be totally painted the color of the band color listed below. All exposed pipe hangers, rods, supports, channels, etc. shall be painted flat black.
- D. Directions arrow and fluid name shall be applied by sticker at same spacing as above. The stickers shall be secured by color coded tape wrapped two times around the pipe at each end of the label or spring cords.

3.5 PIPE AND DUCT IDENTIFICATION:

- A. Piping systems in mechanical rooms shall be completely painted with the applicable colors listed below and have appropriate self-sticking or strap-on identifications and arrows indicating direction of flow. Piping and ducts in chases above ceiling, etc. should be color banded and have stencil markings at appropriate intervals. On straight runs of piping, markings should be no further than 30 feet apart; and stencil identifications, color bands, and direction arrows should be near each valve, pressure reducing valve, heat exchanger, etc. Where pipe passes through walls or floor, marking should be near the penetration on both sides. Markings should be at each directional change of all piping systems. Mechanical room pipe color and the color of bands shall be as follows:

PIPING SYSTEMS AND CONTENTS	COLOR	STENCIL IDENTIFICATION
Water, Condenser Supply	Green	CWS
Water, Condenser Return	Green	CWR
Condensate Drain	Green	COND.
Water, Make-Up	Dark Blue	DOM CW
Water, Hot, Heating, Supply	Red	HWS
Water, Hot,		

Heating, Return	Red	HWR
Ductwork	Black	
Supports, Hangers	Vacuum Black	
Refrigerant	Black on Yellow	

- B. Pipe identification should contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below.
- C. For insulated pipe systems, stencil sizes should be as follows:
1. For pipes up to 1 inch, use 1 inch letters.
 2. For pipes 1 inch to 2 inches, use 2 inch letters.
 3. For pipes 2 inches to 6 inches, use 3 inches letters.
 4. For pipes above 6 inches, use 4 inch letters.
- D. For un-insulated systems, stencil sizes should be as follows:
1. For pipe diameters up to 1 inch, use 1/2 inch letters.
 2. For pipe diameters from 1 inch to 2 inches, use 1 inch letters.
 3. For pipe diameters from 2 inches to 6 inches, use 2 inch letters.

3.6 VALVE IDENTIFICATION:

- A. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, HVAC terminal devices, and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.
- C. Where more than one major machine room is shown for project, install mounted valve schedule in each major machine room, and repeat only main valves which are to be operated in conjunction with operation of more than single machine room.

3.7 MECHANICAL EQUIPMENT IDENTIFICATION:

- A. General: Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 2. Pumps, chillers, and similar motor-driven units.
 3. Fans, blowers, primary balancing dampers and mixing boxes.
 4. Packaged HVAC and central-station units.

5. Tanks and pressure vessels.
 - B. Lettering Size: Minimum 3/8" high lettering for name of unit where viewing distance is less than 2'-0", 3/4" high for distances up to 6'-0", and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 the size of principal lettering.
 - C. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, and warn of hazards and improper operations.
 - D. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.
 - E. Where terminal units or other equipment are installed above accessible lay-in ceilings, provide 1/2" engraved tags attached to ceiling grid directly below unit. White letters. Blue background.

END OF SECTION 23 05 53

SECTION 23 05 93 – TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SCOPE:

- A. This work includes testing all mechanical equipment to determine that its performance is in compliance with the requirements of the contract documents and the adjustment and balancing of the systems so that fluid quantities are delivered to locations as required by the contract documents and that the temperature, humidity, and/or volume can be controlled in accordance with the design intent and space requirements. This work shall not imply a guarantee of the total system, nor shall it relieve sub-contractors or manufacturers of their normal responsibilities.
- B. The mechanical contractor shall perform all work described in preparation of equipment and systems for testing and balancing.
- C. The actual testing and balancing shall be performed by a separate firm specializing in testing and balancing of mechanical equipment hired by mechanical contractor. The T&B contractor to the mechanical contractor shall be a member of NEBB or TAB. The T&B contractor shall be pre-qualified and approved by A/E.
- D. Testing and balance shall not begin until the system has been completed and is in full working order. The mechanical contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing.
- E. The mechanical contractor shall pay the costs of operating the mechanical equipment during the testing and balancing period unless operation of system is required by the general contractor. He shall make arrangements with the General Contractor to pay for his electrical power and water.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION OF EQUIPMENT FOR TESTING AND BALANCING:

- A. The mechanical contractor shall, upon completion of items of work required by his contract and prior to the commencement of the Testing and Balancing Subcontract, as hereinafter specified, thoroughly clean all dirt and debris from equipment, ducts, piping systems, fixtures, strainers, accessories, etc. All bearings, gear boxes, wearing surfaces, or other equipment components requiring lubrication shall be properly serviced as recommended by the equipment manufacturer, and shall be tagged with the date of service and type of lubricant used. All specified cleaning and protective devices shall then be installed in equipment, piping, plenums, ductwork, etc., and systems shall be placed in continuous operation. All fans shall have been in operation for at least twenty-four hours prior to the start of testing and balancing so that initial stretch of drive belts will have taken place, and all other mechanical equipment, including temperature and

operating control devices shall have been adjusted and calibrated for complete and functional operating service.

- B. The mechanical contractor shall provide the Testing and Balancing Contractor at the earliest possible time, copies of all approved equipment, specialties, and control submittal data, together with a set of contract plans and specifications.
- C. The mechanical contractor shall provide all thermometer wells, pressure gauge connections, capped duct thermometer openings, etc., as the T&B contractor require. The T&B contractor shall assist the mechanical contractor in locating these devices as the job progresses.
- D. The mechanical contractor shall provide sufficient time from the complete installation of all systems to the final established completion date of this project so that testing and balancing can be accomplished.

3.2 TESTING AND BALANCING SUBCONTRACT:

- A. Testing, adjusting and balancing shall be performed in accordance with the latest edition of ASHRAE Guide, National Standards for Field Measurements and Instrumentation by the Associated Air Balance Council and the SMACNA Manual for the Balance and Adjustment of Air Distribution Systems.
- B. Submit copies of the proposed test report form for the Engineer's approval before beginning tests. Provide operating curves of equipment. Submit a complete description of all tests proposed in accordance with the shop drawing requirements. Submit copies of all report forms, data sheets, and instrumentation to be used. This submittal data shall include a tabulation of all instruments and devices to be utilized in the performance of testing and balancing operations, and shall include the name of the manufacturer of the instrument or device, model number, range, degree of accuracy, date of last calibration, and how calibrated, or other pertinent information that may be required to determine the utility of the instrument or device.
- C. Balance, adjust and test air moving equipment and air distribution of supply and exhaust systems and all water systems as herein specified. All work by T&B contractor shall be done under direct supervision of a qualified air conditioning engineer. All instruments used shall be accurately calibrated and maintained in good working order. If requested, the tests shall be conducted in the presence of the Engineer responsible for the project and/or in his representative.
- D. Evidence of qualification shall be P.E. registration, AABC certification, or NEBB certification satisfactory to the Engineer. Submit resumes of all key personnel with the shop drawings.

3.3 START-UP TEST OF EQUIPMENT:

- A. Witness and report on the accuracy of the manufacturer's start-up test of equipment. Include copies of these reports in the verification report. Read and record the amperage on each phase of each motor and each circuit of each electrical heater or coil. Measure again under full load to calculate horsepower for performance test. Record nameplate voltage and amps of motors, coils, and all other electrical equipment and trip amps of thermal overloads. All equipment which is not field tested by the manufacturers shall be performance tested and adjusted by the T&B contractor.

3.4 TEMPERATURE CONTROL:

- A. Witness the performance and start-up of the temperature control system and report on any deficiencies which affect system performance. This shall include outdoor, return and relief air damper operation from wide open to tight shut-off, leaving air controls and mixing dampers, mixing valves performance when in bypass as well as wide open. Record dry bulb and wet bulb temperatures in typical rooms comprising approximately 10% of total rooms.

3.5 AIR HANDLING HEATING AND COOLING UNITS:

- A. Measure the cfm of air at the filter or coil section using a rotating vane velometer. Measure the static pressure and velocity at the inlet and outlet of each coil, filter, damper, fan, etc. Measure fan as required under "Fans," in the specification. Measure the total BTU/Hour of the cooling coil and heating coil by measuring entering and leaving DB and WB temperatures and pounds per hour of air flow (SCFM). Measure temperatures entering and leaving coils and compare BTU/Hour. Observe all joints for leaks and report them.

3.6 TERMINAL BOXES:

- A. Read the inlet, outlet and differential pressure at the flow measuring taps supplied by the manufacturer on the box. Compare this to his calibration curve and record CFM. Total the CFM of all diffusers connected to each box and compare it to this reading. Both readings must agree with \pm 3% of the specified air quantity.

3.7 HEATING COILS:

- A. The CFM of each heating coil on a terminal box will be determined above. Read the entering and leaving air temperature and calculate the BTU/Hour capacity. Measure entering and leaving water temperature and calculate peak BTU/Hour capacity on 10% of the coils to confirm balance.

3.8 TESTING PROCEDURES FOR AIR HANDLING UNIT SYSTEMS:

- A. Test and adjust blower RPM to design requirements. Record all pulley and belt data.
- B. Test and record motor full load and operating amperes and voltage on all three phases.
- C. Make pitot tube traverses of main supply ducts and obtain design CFM at fans. Also make velocity traverses of all coils and filter banks.
- D. Test and record system static pressures, suction and discharge.
- E. Test and adjust system for design recirculated air, CFM.
- F. Test and adjust system for design CFM outside air.
- G. Test and record entering air temperatures. (D.B. heating and cooling).
- H. Test and record entering air temperatures. (W.B. cooling).

- I. Test and record leaving air temperatures. (D.B. heating and cooling).
- J. Test and record leaving air temperatures. (W.B. cooling)
- K. Adjust all main supply, return, and exhaust air ducts to proper design CFM.
- L. Adjust all zones to proper design CFM supply, return, and exhaust.
- M. Test and adjust operation of frequency drives for fans.
- N. Test and adjust each diffuser, grille, and register to within 5% of design requirements where several rooms are controlled as a zone.
- O. Size, type, and manufacture of diffusers, grilles, registers, and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations and checked against field measurements.
- P. All fire dampers shall be tested to prove they open and close properly.
- Q. All diffusers, grilles, and registers shall be adjusted to minimize drafts and noise in all areas.
- R. Verify correct system pressures.
- S. As a part of the work of this contract, the mechanical contractor shall make any changes in the pulleys, belts, and dampers required for correct balance at no additional cost to Owner or engineer.

3.9 TESTING PROCEDURES FOR HYDRONIC SYSTEMS

- A. Hydronic balancing procedures consist of attaining proportional fluid flow quantities throughout hydronic systems, in accordance with design requirements.
- B. Preparing for Hydronic System Balancing: Hydronic system balance shall not begin until the NEBB test and balance agency has verified the following:
 - 1. The system is completely filled.
 - 2. The system is clean.
 - 3. The system is free of air.
 - 4. All services valves are open.
 - 5. All strainers are provided with clean screens having proper perforations.
 - 6. Control valves are piped properly.
 - 7. All coils are correctly piped.
 - 8. Coil fins are straight and clean.
 - 9. Properly balancing devices (meters, pressure taps, thermometer wells, and balancing valves) are in place and correctly located.
 - 10. Automatic temperature control system is in operation.
 - 11. The pressure is adequate to completely fill the system.
- C. The NEBB test and balance contractor shall measure the amperes of all pump motors before hydronic balancing is started, and shall take proper steps to correct and report any overloads.

- D. The NEBB test and balance contractor shall not continue the hydronic balancing if, at any time, hazardous conditions are observed. Any such conditions shall be reported before proceeding further.
- E. General Procedures:
 - 1. All flow quantities, temperatures, and pressures shall be measured according to the NEBB National Standards.
 - 2. If, during the hydronic balancing, the NEBB test and balance agency observes any conditions that will not permit proper balancing, those conditions shall be reported immediately.
 - 3. If pressure differential is found to be inadequate or excessive, the balancing procedure shall be stopped until corrective action is taken.
- F. Systems:
 - 1. Constant Flow Systems: Where three-way temperature control valves are provided, the balancing valve in the bypass connection shall be restricted so that the flow through the bypass (with the three-way valve in the full bypass position) is the same as full flow through the coil.
 - 2. Variable Flow Systems: Sufficient valves shall be opened or closed to simulate design diversity if applicable. All bypass systems shall be set.
- G. Coil Banks:
 - 1. To compensate for any stratification of air temperature or uneven air velocity across the coil bank, the water flow through banks of multiple coil sections shall be balanced thermally so the return water temperature of each coil is the same. The balancing valve of at least one coil shall be fully open.
- H. Pumps:
 - 1. If there are no meters in the system, the pump shall be used for estimating the total system flow rate.
- I. Setting Pump Discharge Flow:
 - 1. Setting Pump Flow By Modifying Impeller Size: Proportionally balance the terminals, fully open the discharge valve and calculate the new pump impeller diameter required to provide design flow to the terminals. The proper size impeller will be provided by the mechanical contractor.
- J. After the modified impeller is installed, the test and balance agency shall measure:
 - 1. Shutoff head.
 - 2. Total GPM
 - 3. Discharge pressure
 - 4. Suction pressure
 - 5. Voltage
 - 6. Current

- K. Measure water flow by flow meters; pressure differential across pumps and temperature differentials across heat exchangers. Balancing by temperature difference across air to water heat exchangers shall be done only after air balance is complete. Pressure shall be measured by standard or differential pressure gauges.
- L. Instruments
 - 1. All instruments used shall be certified as having been calibrated within a six month period prior to use.
 - 2. Manufacturer, model and range of instruments used to make the various readings and measurements shall be listed in the written report.
- M. Provide six copies of a report which shall contain the following information:
 - 1. Fan and Pumps:
 - a. Manufacturer and model
 - b. Size, arrangement and class
 - c. Motor nameplate data
 - d. RPM
 - e. CFM or GPM
 - f. Pressure difference across fan or pump.
 - g. Ammeter readings
 - h. Voltmeter readings
 - i. Heater sizes
 - j. Standby pump for heating and cooling use independently.
 - k. For variable volume pumping systems, determine optimum differential pressure setpoint to achieve design flow at most remote coil.

3.10 SOUND TESTS:

- A. In 10% of the rooms the T&B contractor shall make noise tests as described by the engineer in accordance with the ASHRAE Guide, and as herein specified.
- B. Using approved instruments conduct tests in selected areas of the building as specified below. Sound level readings shall be measured in decibels on the "A" and "C" scales of the General Radio Company sound level meter, or equal sound level meter that meets the current American Standard (z24.3-1944) based on the acoustic reference power of dB/-re 10-13 watts. Readings shall set forth the total random sound level of the selected rooms or areas with the system in operation, as compared to total background sound level with the system not in operation. The system increase over the background levels shall be recorded in decibels on the "A" and "C" scales. If sound levels are above those listed, adjustments shall be made to bring the sound level within the range set forth. This shall be done with the equipment as installed, if possible. Record octave band readings in rooms where noise is above normal. Record dBA in 10% of rooms.
- C. Sound levels in decibels at each diffuser, grille, or register in occupied area, shall be measured approximately five feet above the floor on a line approximately forty-five degrees to the center of the diffuser, etc., on the "A" and "C" scales of a General Radio Company sound level meter. Where it is apparent that noise level reading will be taken only one diffuser per room.

- D. If it is not possible to achieve required noise levels with existing equipment, the areas having excessive noise levels shall be listed and recommendations shall be obtained from the engineer for corrective actions required to correct the sound problems.

3.11 REPORTS

- A. Upon completion of testing and balancing of all systems, the test and balance agency shall submit 6 copies of neatly typed or printed certified test reports bearing the professional engineering seal of the T&B firms supervision engineer containing all compiled data and test results. Final inspection of the project will be made only after certified test reports are submitted showing that all systems have been balanced and performance tested. Any critical deviation of equipment capabilities or performance from design and specification requirements shall be noted in the balancing and testing reports, together with any recommendation for efficient and economical correction of the deficiency, and shall be pointed out to the Engineer as soon as it is observed.
- B. Settings of dampers, splitters, valves, pulleys and other volume adjusting devices shall be permanently marked after completion of balancing and adjusting, so that they can be restored if disturbed at any time.

3.12 COORDINATION:

- A. All efforts of the test and balance contractor shall be coordinated with the mechanical contractor. Any installation or operational discrepancies found during the test and balance procedure shall be brought to the attention of the mechanical contractor and engineer. Such discrepancies shall be corrected and system retested and balanced before the completion of the final report.

3.13 COMMISSIONING:

- A. The mechanical contractor and the test and balance contractor shall be a part of any commissioning effort that might be specified or required. Contractors shall provide such tests, documentation, reports, verification, and assistance as necessary to insure the satisfactory commissioning and operation of the mechanical systems in accordance with the "design intent". Such effort shall be as directed by the engineer and/or an independent commissioning agent.

3.14 SYSTEM DEMONSTRATION:

- A. The test and balance contractor shall assist the mechanical contractor in the demonstration of the completed mechanical system. Such demonstration shall occur in the presence of the engineer or commissioning agent and shall include such operational test and verifications as the engineer may direct.

3.15 CERTIFICATION AND WARRANTY:

- A. Test and balance contractor shall certify the test and balance report to be a true, accurate, and complete accounting of the final operating conditions of the HVAC systems. During the mechanical contractor's one year warranty, the test and balance contractor shall provide any retesting and/or verification required to satisfy the warranty requirements.

END OF SECTION 23 05 93

SECTION 23 05 95 - SYSTEM TESTING, CLEANING & START-UP

PART 1 - GENERAL

1.1 SCOPE:

- A. This work includes cleaning the various air and water systems, pressure testing to insure tightness, and start-up of the various systems to prove their operational capability.

PART 2 - PRODUCTS

2.1 GENERAL

- A. This contractor shall provide all water and other materials used for testing.

PART 3 - EXECUTION

3.1 TESTING SYSTEMS:

- A. Pipe pressure testing: Prior to testing, remove or otherwise protect from damage all control devices, trap bellows, air vents, or other devices not designed to withstand the test pressure.
- B. Piping Pressure Tests: The following system shall be hydrostatically tested at a pressure of 1-1/2 times the normal working pressure, or 125 psi, whichever is greater:
 - 1. Condenser and Hot Water Piping
 - 2. Equipment Vents
- C. All work must remain uncovered until required tests have been completed but in the event that the project construction schedule required it, this contractor shall make arrangements for prior tests on portions of the work involved. All costs of these tests shall be paid by this contractor. Any damage caused as a result of tests shall be repaired at the expense of this contractor.
- D. It is desirable that each system be tested in its entirety, but the various systems may be tested in sections as may be required to expedite the work of other trades.
- E. Test pressure shall be maintained without pumping for a minimum of 4 hours without loss of pressure other than may be attributable to changes in atmospheric conditions. Sweats or drips will not be accepted.
- F. After satisfactory completion of tests and before permanently connecting equipment, traps, strainers, etc. flush entire pipe systems for sufficient length of time to free interiors completely of foreign matter.

3.2 LEAKAGE TESTING FOR MEDIUM PRESSURE DUCT SYSTEM:

- A. The installed medium pressure duct system shall be sealed and SMACNA Class "A" leakage rating tested.
- B. The air leakage at the test pressure shall be measured by a calibrated orifice type of flow meter.
- C. If the system is tested in sections, the leakage rates shall be added to give the performance of the whole system.
- D. Leakage concentrated at one point may result in objectionable noise even if the system passes the leakage rate criteria. This noise source must be corrected to the satisfaction of the engineer.
- E. The orifice of flow measurement device must have been individually calibrated against a primary standard, and this calibrated curve permanently attached to the orifice tube assembly.
- F. Testing must be in accordance with a printed procedure submitted to the engineer for approval.

3.3 TESTS FOR LOW PRESSURE DUCT:

- A. All low pressure make-up supply, return and exhaust duct, plenums, casings shall be tested and made airtight before covering or concealing and shall be sealed and SMACNA Class "A" leakage rating tested.
- B. Tests shall be made before insulation is applied to joints, fittings, or valves. The A/E representative shall be given the opportunity to observe all tests and items under test shall not be covered up until after the A/E representative has observed the test or has been given a letter waiving the right of observation of the test.

3.4 CLEANING OF SYSTEMS:

- A. The inside of the air terminal units, ducts, plenums, and casings shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust and then shall be vacuum cleaned before installing outlet faces. Equipment shall be wiped clean, with all traces of oil, duct, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and new filters shall be installed after all construction dirt has been removed from the building and the ducts, plenums; casings, and other items specified hereinbefore have been vacuum cleaned. It shall be the responsibility of this contractor to maintain the system in this clean condition until final acceptance.
- B. Clean all piping systems, equipment, and accessories (especially pumps, valves, flange faces, gauges, etc.) of cutting chips and foreign matter while installing.
- C. Cleaning of piping systems shall be as described under Chemical Treatment.
- D. Temporary bypasses shall be provided for all water coils to prevent flushing water from passing through coils.

3.5 GENERAL:

- A. Be careful to provide all sight glasses, control valves, pumps, and any items that could be damaged by foreign material with 40 mesh screen on the inlet side, or bypass, or remove such items.
- B. Clean out the strainers, air separators, and all low velocity areas where dirt accumulated.
- C. Protect all water systems from freezing.
- D. Clean all strainers and dirt legs.

3.6 START-UP AND TEST:

- A. Each system shall be started up and a preliminary test made as follows:
 - 1. This contractor shall make trial runs of each piece of equipment furnished by him. This contractor shall provide all oil, grease, and other lubricants for the operation of all equipment until acceptance. This contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up-to-date of acceptance of the equipment, and for a period thereafter as per the general building warranty. The contractor shall be required to protect all bearings during installation and shall thoroughly grease steel shafts to prevent corrosion.
 - 2. The contractor shall align each shaft and adjust all pulleys to run substantially vibration-free. Where equipment cannot be so adjusted by the contractor, the manufacturer shall provide a machinist or serviceman to make these adjustments. Vibration-free is construed to mean that rotating machinery shall not exceed a self-excited vibration velocity of 0.10 inches per second in any direction when measured with a vibration meter on the bearing caps of the machine.
 - 3. Belts shall be checked for alignment and tightened to proper tension.
 - 4. Overload elements in motor starts shall be checked and proper elements provided as required for the motor full load amp rating.
 - 5. Glands, seals, etc. shall be examined and properly adjusted.
 - 6. Air vents shall be bled.
 - 7. Equipment shall be started per manufacturer's instructions and run in.
 - 8. Read amperage and voltage on each motor the first time it is started, and check direction of rotation.
 - 9. Run an operating test on each piece of equipment. The tests shall be sufficient to show that the equipment has been run and observed and shall include the following:
 - 10. Each fan amp. draw and discharge static pressure.
 - 11. Temperature of air entering and leaving each coil in air handling unit.

12. Pressure drop across each filter bank service other than individual rooms.
13. Volts and amps on each motor.
14. Results of preliminary tests shall be submitted before test and balance sub-contractor commences his work.
15. Test atrium smoke removal system with fire alarm contractor and in the presence of independent inspectors.

END OF SECTION 23 05 95

SECTION 23 31 13 - DUCTWORK

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This work consists of providing all labor, materials, equipment, and services necessary for the installation of all sheet metal work and related equipment and accessories as indicated on the drawings, required and/or as specified.

1.2 STANDARDS:

- A. All ductwork installation including hangers, supports, access doors, etc. shall be in accordance with the latest recommendations of the ASHRAE Guide, the SMACNA High (medium) Pressure Duct Construction Standards, SMACNA Low Pressure Duct Construction Standards, SMACNA Duct Liner Application Standard, and with details on the drawings.

1.3 QUALIFICATION OF MEDIUM VELOCITY DUCT SUPPLIER:

- A. The round and flat oval medium pressure ductwork and fittings, as shown on the plans, shall be manufactured by a company who has had as its principal business the manufacture of medium pressure duct and fittings for at least three years.
- B. This Contractor shall submit with his proposed list of equipment manufacturers the name of the manufacturer of the medium pressure ductwork.

1.4 GENERAL REQUIREMENTS:

- A. Provide all metal ductwork as indicated on the drawings. Ducts, unless otherwise specified shall be constructed entirely of galvanized steel sheets. Where specified or indicated on drawings, ducts shall have duct lining installed on the inside of the ducts. The duct dimensions indicated on the drawings are the net air stream dimensions. Add to the sheetmetal dimensions to allow for the duct liner.
- B. All sheet metal work shall be performed by trained mechanics, experienced in this type of work and shall be installed in a neat workmanlike and substantial manner.
- C. All duct joints sealing compounds, glues, mastics, and adhesives used on duct construction shall be "Fire Safe" and be "U.L." approved and labeled.
- D. In all cases where duct sleeves are roughed through walls, floors, or ceilings, they shall be blocked and braced to prevent sagging or crushing occurring during construction. Ducts passing through floors of above ground equipment rooms shall have concrete curbs and flashing to prevent leaking to water around duct openings. Duct openings through exposed wall of equipment room shall be fitted with sheet metal collars to make a neat closure between opening and sleeve.
- E. The general location of ducts shall be as shown. Exact location of ductwork into proper relation with other equipment features of the building.

- F. Material shall be prime galvanized sheet steel free from blisters or other mechanical defects.
- G. Shop fabricate ductwork in 4, 8, 10 or 12-foot lengths, unless otherwise indicated or required to complete runs. Pre-assemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for re-assembly and coordinated installation.

PART 2 - PRODUCTS

2.1 DUCTWORK MATERIALS:

- A. Exposed ductwork materials: Where ductwork is indicated to be exposed to view in occupied spaces, vertical chases and equipment rooms, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, oil canning, stains and discolorations, and other imperfections, including those which would impair painting.
- B. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ANSI/ASTM A 527, lockforming quality, with ANSI/ASTM A 525, G90 zinc coating; mill phosphatized for exposed locations.
- C. Stainless Steel Sheet: Where indicated, provide stainless steel complying with ANSI/ASTM A167; AISI Type 302/304/316 with No. 4 directional polish where exposed to view in occupied spaces. Protect finished surfaces with mill-applied adhesive protective paper, maintained through fabrication and installation.

2.2 LOW PRESSURE DUCTWORK:

- A. Ductwork shall be designed for velocities not exceeding 2000 FPM or static pressures not exceeding 2 inches.
- B. Sheet metal gauges, cross joints and reinforcing shall be as indicated on Table 1 of SMACNA.
- C. The Pittsburg lock shall be used for longitudinal seams and shall conform to Plate No. 5A of SMACNA.
- D. Elbows shall be square with double thickness turning vanes and shall conform to Plate No. 22 of SMACNA.
- E. Tapers and offsets shall conform to Plate No. 23 of SMACNA.
- F. Where changes are made in shape of ducts full areas shall be maintained and changes shall be gradual to minimize pressure drop.
- G. Ducts terminating at grilles and registers shall be provided with suitable means of attachment.
- H. Air cushions shall be provided beyond the last take off on a duct run at least equal to the depth of the duct at that point.

- I. Obstructions in ductwork shall be streamlined and shall conform to Plate no. 24 of SMACNA.
- J. Branch round ducts should enter main using spin-in steel fittings with balancing damper by Genflex.

2.3 KITCHEN HOOD EXHAUST DUCTWORK:

- A. Ductwork shall be constructed of #16 gauge welded black steel.

2.4 DRYER EXHAUST DUCTWORK:

- A. Ductwork shall be 20 gauge G80 steel with no longitudinal joints on bottom of ductwork. All joints shall be sealed water and moisture tight. No screw penetrations through duct.

2.5 MEDIUM PRESSURE DUCTWORK:

- A. Ductwork shall be designed for velocities in excess of 2000 FPM and static pressure from 2" W.G. static pressure to 6" W.G. static pressure not to exceed 6" W.G. static pressure.
- B. This contractor shall not provide additional bends, takeoffs, offsets or changes in shape without prior approval of engineer.
- C. Air cushions shall be provided beyond the last takeoff on a duct run at least equal to the depth of the duct at that point.
- D. Zinc coatings burnt off of steel during welding, shall be painted to prevent corrosion at the weld.

2.6 RECTANGULAR MEDIUM PRESSURE DUCTWORK:

- A. Sheet metal gauges, cross joints, and reinforcing shall be as indicated on Figure 3-1 of SMACNA.
- B. Joints selected shall be constructed in accordance with figures 3-4 thru 3-15. Sealant shall be applied at all joints.
- C. The rods shall be fastened in accordance with Figures 3-18 and 3-20 of SMACNA.
- D. Fasteners shall be in accordance with Figure 3-19 of SMACNA.
- E. Radiused elbows shall be provided with splitters and shall be in accordance with Figures 3-21 and 3-22 of SMACNA.
- F. Square throat elbows with turning vanes shall be in accordance with Figure 3-23 of SMACNA.
- G. Transformations shall be full area type in accordance with Figures 3-24 thru 3-27 of SMACNA.
- H. Branch connection shall be in accordance with Figure 3-28 of SMACNA.

I. Obstructions in ductwork shall not be allowed.

2.7 CIRCULAR MEDIUM PRESSURE DUCTS:

- A. All medium pressure circular ducts and fittings shall be manufactured by the same firm to assure tight fit of all ductwork and components.
- B. Submittals shall include manufacturer's data on materials and accessories for medium pressure ducts and fittings.
- C. The fittings shall be manufactured to published standards for dimensions and construction details. Installation manuals shall be supplied to the contractor to provide detailed instructions on: Assembly, Joint Sealing, System Pressure Testing and Leaks, and reinforcement of ducts.
- D. The fitting test data shall cover the friction loss tests of die-stamped elbows in diameters 3" through 8", 5-piece gored elbows in diameters 9" through 80", reducers, and divided flow fittings of Tee, Lateral, and Conical types, plus the coefficients of abrupt turn fittings including Y-branch, Bullhead Tee, Capped Cross, Cushion Head Cross, and Mitered Elbow Fittings. The friction loss characteristics of divided flow fittings combined with elbows for cross-over connections, as detailed in plans, are to be included in this submittal.
- E. The spiral pipe shall have locked seams so made as to eliminate any leakage under the pressures for which this system has been designed. Longitudinal seam duct shall have a fusion welded butt seam. Pipe, fittings and couplings shall be of the following minimum gauges per SMACNA Standards.
- F. All fittings are to have continuous welds along all seams. All divided flow fittings are to be manufactured as separate fittings, not as tap collars welded into spiral duct sections. All 90 degree tees and 45 degree laterals (wyes) up to and including 12" diameter tap size shall have a radius entrance into the tap, produced by machine or press forming. The entrance shall be free of weld buildup, burrs, or irregularities.
- G. Elbows in diameters 3" through 8" shall be two section stamped elbows. All other elbows shall be gored construction with all seams continuous-welded. Elbows shall be fabricated to a center-line radius 1.5 times the cross-section diameter. All elbows, not die-stamped shall be fabricated according to the following schedule:

	<u>Elbow Angle</u>	<u>Number of Gores</u>
1.	Less than 30 degree	2
2.	30 degree thru 60 degree	3
3.	Over 60 degree	5

H. Where it is necessary to use 2-piece mitered elbows, they shall have turning vanes in accordance with the following schedule:

	<u>Diameter</u>	<u>Number of Vanes</u>
1.	3" thru 9"	2
2.	10" thru 14"	3
3.	15" thru 19"	4
4.	20" and Over	5

- I. The leading edge of all vanes in ducts over 20" diameter shall be hemmed with ½" fold-back. Turning vanes in ducts over 24" shall be reinforced by rods or sectional construction to limit unsupported length to 24". Vanes shall be minimum of 20 gauge.
- J. The reduction of divided flow fittings shall be conical spun section in the thirty-six common reductions in sizes 4" through 22".
- K. Spun bellmouth connections are to be used at each round take-off from the high pressure plenum.
- L. Galvanized areas that have been damaged by welding shall be coated with corrosion resistant aluminum paint.

2.8 COUPLINGS FOR ROUND MEDIUM PRESSURE DUCT:

- A. Pipe-to-pipe joints in diameters to 50" are by the use of sleeve couplings, reinforced by rolled beads.
- B. Pipe-to-fitting joints in diameters to 50" are by slip-fit of projecting collar of the fitting into the pipe.
- C. Insertion length of sleeve coupling and fitting collar is 2" for diameters through 9" and 4" for diameters 10" and up. Pipe-to-pipe and pipe-to-fitting connections in diameters above 50" are made by angle ring flanges. Connections 51" and up are made by the loose ring "Van Stone" flange. A one-half inch flange is provided for the body ends of duct sections and fittings to act as a gasketing surface for sealing. The angle ring is rolled, welded ring 2" x 2" x 3/16".
- D. Bolt hole spacing for angle rings shall not exceed 6".
- E. If duct sections in diameters greater than 50" are supplied in lengths greater than 4' lengths, one angle ring must be welded to duct on 4' centers. Welding can be an intermittent weld of 1" and 4".
- F. Girth reinforcing and girth joints shall be in accordance with Figure 2-2 of SMACNA.
- G. Branch and take-off fittings shall be "conical tees" or "conical tee reducing" fittings.
- H. Final connections to the individual terminal supply units shall be made by means of a flexible duct. All such ductwork shall have a Class "A" seal and shall be tested at 3.0" w.g. as outlined in SMACNA Manual for Balancing and Adjustment of Air Distribution Systems. Total leakage shall not exceed 1% of supply air fan design CFM.
- I. Branch fittings and reducers shall be as indicated on plans and in accordance with Figures 2-5 and 2-6 of SMACNA.
- J. Obstructions in ductwork shall not be allowed.
- K. Transformation pieces at fans and attenuators shall be fabricated of not less than 18 gauge galvanized steel suitably braced.
- L. Volume dampers shall be of the low pressure drop, balancing type.

2.9 FLEXIBLE DUCTWORK:

- A. Insulated flexible duct shall be FlexMaster 8-M rated to 6" working pressure. The liner shall be as described for type 8-M encapsulating a spring steel helix. The liner shall completely shield the nominal 1" x 1 lb. per cu. ft. fiberglass insulation from the air stream. A tough seamless non-vinyl exterior vapor barrier jacket shall complete the assembly. It will be in compliance with the provisions of UL-181 Class 1 Air Duct Material.
- B. Ductwork shall be a maximum of 6'-0" long and shall be provided with a flame resistant PVC vapor barrier and 1" thick, 3/4" density fiberglass insulation.
- C. Ductwork must comply with NFPA Bulletin 90A and be listed as a Class I connector per UL Standard 181.

2.10 FLEXIBLE EQUIPMENT CONNECTION:

- A. All connections between equipment and ductwork shall be made with a flexible connection consisting of a heavy glass fabric, double coated with neoprene. Material shall withstand the air pressure, 250 deg. F. temperature continuously, be fire resistant, waterproof and airtight and shall be the product of Vent Fabrics, Inc. or equal.

2.11 DUCT LINER:

- A. Liner shall be 1" thick, with a thermal conductivity of 0.23 BTU/Hr.Sq.Ft./deg. F./in at a mean temperature of 75 deg. F, , or approved equivalent.
- B. Liner shall be smooth finish, air flow side with a SMACNA standard cleanable surface and Green Guard rated anti-microbial coating.
- C. Adhesives shall conform to Adhesive and Sealant Council "Standards for Adhesives for Duct Liner" ASC-A-7001-1971.
- D. Linings shall be designed for velocities not exceeding 2000 FPM.

2.12 DUCT SEALANT:

- A. Non-hardening, non-migrating mastic or liquid elastic sealant (type applicable for fabrication/installation detail) as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.

2.13 DUCT CEMENT:

- A. Non-hardening migrating mastic or liquid neoprene based cement (type applicable for fabrication/installation detail) as compounded and recommended by manufacturer specifically for cementing fitting components, or longitudinal seams in ductwork.

2.14 CLOTHES DRYER EXHAUST DUCT:

- A. Dryer exhaust ducts which are not designed for a specific dryer shall be constructed of minimum 0.0217 inch (0.551 mm) galvanized steel. The ducts shall have smooth interior finish with joints running in the direction of the air flow. The entire exhaust

system shall be properly secured in place. Provide wall cap with damper for 4" vents and roof rain cap for commercial dryers.

PART 3 - EXECUTION

3.1 INSTALLATION OF DUCTWORK - GENERAL:

- A. Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight (2% leakage) and noiseless (no objectional noise) systems, capable for performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.
- B. Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct unusable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building. Limit clearances to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work. Do not locate ductwork over (parallel to) position indicated to extend to deck.
- C. Electrical Equipment Spaces: Do not run ductwork through transformer vaults and their electrical equipment spaces and enclosures.
- D. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct-plus-insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1 1/2".
- E. Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- F. Support ductwork in manner complying with SMACNA "Low Pressure Duct Standards - 5th Edition" hangers and supports section.

3.2 DUCT HANGERS AND SUPPORTS:

- A. Hangers and supports shall conform to the latest edition of SMACNA Standards Plates 16, 17, 18 and 19.
- B. Hangers and supports for ductwork shall not support any other devices unless approved in writing by Engineer.
- C. Hanger sizes for rectangular duct shall be as follows for 6 foot spacing.

Longest Dimension	Round	Strap	Trapeze
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	<u>of Duct</u>	<u>Hangers</u>	<u>Hangers</u>	<u>Shelf Angles</u>
1.	Up thru 18"	8 Ga. Wire	1"x16 Ga	1"x1"x1/8"
2.	19" thru 30"	8 Ga. Wire	1"x16 Ga	1"x1"x1/8"
3.	31" thru 42"	1/4" Rod	1"x16 Ga	1 1/2"x1 1/2" x1/8"
4.	43" thru 60"	3/8" Rod	1"x16 Ga	1 1/2"x1 1/2" x1/8"

D. All ductwork shall be properly secured directly to the structure of the building using suitable strap or angle hangers. Hangers with a load of 50 pounds or less may be at the bottom chord panel points of bar joists. Hangers with larger loads must be hung from top chord of bar joists. C clamps are not to be used.

E. Risers within duct shaft shall be supported every 8 feet by angleclips.

3.3 DUCT CONSTRUCTION FOR LOW VELOCITY DUCTS:

A. All joints in supply duct work shall be sealed with an approved type duct sealing tape or sealing compound. Where pressure sensitive tape is used for sealing duct joints use an approved type tape sealer in addition to the adhesive on the tape. Joint sealer to be U.L. labeled and fire safe.

B. Changes in shape and dimension shall conform to the following:

1. For increases in cross-sectional area, the shape of the transformation shall not exceed 1" in 7".
2. For reductions in area, the slope may be 1" in 4", but 1" in 7" is preferred.
3. All changes in direction shall either be with a radius not less than 1/2 width of the duct, or square elbow (both) with turning vanes.

3.4 DUCT CONSTRUCTION FOR KITCHEN HOOD EXHAUST DUCTWORK:

A. Fabricate joints and seams with continuous welds for watertight construction. Provide for thermal expansion of ductwork through 2000 degree F temperature range. Install without dips or traps which may collect residues, except where traps have continuous or automatic residue removal. Provide access openings with door at each change in direction and every 15' length, located on sides of duct 1 1/2" minimum from bottom, and fitted with greasetight covers of same material as duct.

B. Ductwork shall meet the requirements of N.F.P.A. 96.

C. Ductwork shall be provided with welded seams and 2" x 2" x 3/16" matched angle iron joint connections. All joints shall be ground smooth, fitted and bolted with asbestos gaskets to make connections airtight. The exterior of all kitchen range exhaust ducts shall have 1-1/2" x 1-1/2" x 1/8" welded angles, punched for securing insulation where specified.

3.5 DUCT CONSTRUCTION FOR DISHWASHER HOOD EXHAUST DUCTWORK:

A. Ductwork shall be evenly pitched back to dishwasher. All joints shall be sealed water and moisture tight with silicon sealant.

- B. Wherever aluminum is in contact with concrete, the aluminum shall be cleaned and painted one coat of zinc chromate before erection.

3.6 DUCT CONSTRUCTION FOR MEDIUM PRESSURE RECTANGULAR DUCTWORK:

- A. All high velocity ducts must have all seams, joints and connections with sealing compound of an approved type. Sealing compound to be liquid sealer or bead type sealer as required to meet the special conditions. All duct sealing compound of an approved type. Sealing compound to be liquid sealer or bead type sealer as required to meet the special conditions. All duct sealing compound must be fire safe and labeled.
- B. Shop procedure for sealing ducts shall be as follows:
 - 1. Before fittings and joints are assembled, duct sealer shall be applied to rivets, grooved seams and tap-off collars. On the internal side of the metal, Pittsburgh lock, pocket shall be flooded with sealing compound using pump type oil can, and the duct assembled.
 - 2. Duct sealer of an approved type shall be brushed around reinforcing rod washers, corners, rivets, notches and tap-off collars after duct is assembled. A double "S" slip or other approved type connectors shall be installed on the air leaving side of the duct and fastened in-place, using meal screws on 6 inch centers. Sealing compound shall be brushed into connecting lap and corner joints and all seams of "S" slip or approved type connector.
 - 3. Coat inside of connecting lap of "S" slip and duct surface with sealing compound. Where possible sealing should be done on inside of the ductwork.
- C. Field procedure for sealing joints shall be as follows:
 - 1. Sealing compound shall be spread on the inside of the double "S" slip or connector and the joints of duct assembled. Immediately after joints are assembled, holes will be drilled through the "S" slip and metal screws inserted on 6 inch centers. Sealer shall be applied over the screw head.
 - 2. After 24 hours, second coat of sealing compound shall be spread over the joints and allowed to dry for 24 hours before testing.
 - 3. Where joints are not accessible for proper sealing, hand holes should be cut in the duct and the joints sealed from the inside. Special care shall be taken to seal off duct corner.
 - 4. When testing ducts for leaks, leaks should be marked and sealed without pressure, using sealing compound and allowed to dry for 24 hours.
 - 5. All branch take-offs taps to terminal units shall be conical fitting or as indicated on drawings. All perpendicular take-offs shall be made the bell-mouth tappings or fittings.
 - 6. All square bends and elbows with a center line radius of turn less than 1-1/2 by the width of the duct shall be provided with "formed" turning vanes. These vanes shall be made of 20 gauge galvanized metal up to 18 inches in length and 18

gauge for over 18 inches length. Vanes shall be spaced on approximately 3 inch center. Vanes shall have "Runners" attached where shown on plans.

3.7 DUCT CONSTRUCTION FOR MEDIUM PRESSURE ROUND DUCTWORK:

- A. Approved sealer Minnesota Mining EC-800 shall be applied to the male end of the couplings and fittings. After the joint is slipped together, sheet metal screws shall be placed ½" from the joint bead for mechanical strength. Sealer shall be applied to the outside of the joint extending one inch on each side of the joint bead and covering the screw heads. An approved tape shall be immediately applied over the wet sealer.
- B. The duct sealer shall be specifically formulated for the job of sealing the field joints for high pressure system. The sealer shall be compatible with an approved type duct tape so the two shall cure and bond together.
- C. Flanged joints shall be sealed by Neoprene Rubber gaskets.
- D. All duct sealer shall be fire safe and shall be "U.L." approved for this use.
- E. All exposed duct shall be dual wall with 1" internal duct.

3.8 FLEXIBLE DUCTWORK:

- A. The installation shall conform to the techniques shown in the UL approved and factory supplied instructions specified for the product. Submittals will include product data sheets as well as approved installation instructions. Care is to be taken that all run-outs of flexible duct are installed as straight as practical and fastened so as to eliminate leakage and vibration.
- B. Peel back jacket and insulation at end of flexible duct. Fit duct over collar or sleeve and clamps and seal as described for uninsulated flexible duct. Pull jacket and insulation back in place and secure with two wraps of duct tape.
- C. Secure flexible duct to collar or sleeve with ½ inch wide aluminum galvanized steel or stainless steel bands or clamps and matching seals. Clamping device shall be two inches back from end of flexible duct. Seal with two wraps of duct tape Polyhen #222, Arno #C-520 or Nashua No. 357.

3.9 DUCT LINER:

- A. Sound absorbing lining shall be secured to the ducts by a complete covering coat of adhesive and mechanical fasteners 12 inch on centers.
- B. For horizontal runs when the duct width or height exceeds 20", the liner shall be additionally secured with fasteners starting within 3" of the upstream transverse edges of the duct liner boards and be spaced at a maximum of 15" O.C. and 15" from the longitudinal joints. On vertical runs, the fasteners shall be used when either dimension exceeds 12".
- C. All butt edges of the lining shall be joined with a suitable factory adhesive. Coated side shall be toward air stream. That portion of ducts that are lined shall be increased in size equal to the thickness of the lining. Duct sizes shown on the plans are net inside dimensions with lining in place.

- D. Provide liner in transfer return air traps and in return grille boots.
- E. All abutting edges of duct linings shall be sealed and all exposed edges of linings shall be installed with a sheet metal nosing.

3.10 CLEANING AND PROTECTION:

- A. Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.
- B. Strip protective paper from stainless steel ductwork surfaces, and repair finish wherever it has been damaged.
- C. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.
- D. Temporary Cooling or Heat: Provide MERV 8, roll type filter media at "all" return air inlets to ERV, RTU and heat pumps if systems are to be used during finishing work phase of construction. Remove prior to occupancy and replace with scheduled type of MERV 13 final filters.

END OF SECTION 23 31 13

SECTION 23 33 00 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work consists of furnishing all labor, materials, equipment, and services necessary for the installation of all supply, return, ventilation, and exhaust ductwork accessories and related equipment and accessories as indicated on the drawings, required, and as specified.
- B. Accessories by Ruskin, Nailor, Indeco are acceptable.

PART 2 - PRODUCTS

2.1 LOUVERS:

- A. All louvers shall be provided by the General Contractor. This contractor shall make all connections thereto and install 18 gauge dual wall insulated blank-off sheets as required and/or indicated on the drawings for blank off of unused portion of louver.

2.2 INSTRUMENT TEST HOLES:

- A. Provide test holes Ventlok 699-2 or approved equal complete with gasket and heavy screw cap.

2.3 FIRE DAMPERS:

- A. Damper blades shall be housed outside of the air stream and shall not restrict the air flow, and be Type-B construction.
- B. Fire dampers shall be UL listed.
- C. For each fire damper provide a collar of the following gauge.

	<u>Width or Height</u>	<u>Minimum</u>
	<u>Maximum Dimension</u>	<u>Metal Gauge</u>

- | | | |
|----|-----------|----|
| 1. | Up to 36" | 16 |
| 2. | Over 36" | 14 |

- D. Dampers shall be of the integrally hinged, folding plate curtain type.
- E. Dampers shall be compatible with firewalls, partitions or ducts within which they are to be installed and shall be complete with 160°F fusible link and link retainer.
- F. Where dampers are installed in vertical airflow positions, they shall be provided with vertical stainless steel closure springs and cam type blade locks. The locking device shall be so designed as to permit dampers to be reset easily without being removed from the partitions in which they are resolved.

2.4 COMBINATION FIRE/SMOKE DAMPERS:

- A. Each damper shall be static type airfoil blade UL555S leakage class I, 1½ hour rated, 16ga frame with double skin blade at 14 ga equivalent, maximum 6" wide blade.
- B. Provide each damper with fast acting 24V controller actuator, with end switch feedback to BAS and wall sleeve.
- C. Model shall be Ruskin model FSD60-BAL (or pre-approved equal) with no more than 0.15" pressure drop, fully opened at 1750 feet-per-minute on a 48"x12" damper size.

2.5 DUCT ACCESS PANELS:

- A. Provide hinged access doors, Ruskin ADH24-HP or approved equal near each damper and smoke detector.
- B. Door frame shall be pre-insulated internally with 1" thick 1-1/2# coated fiberglass in a 24 gauge galvanized steel casing and a 24 gauge galvanized door frame.
- C. Frame shall be provided with a foam gasket seal between frame and duct and between frame and door.
- D. Hinged door shall be locked with a cam lock latch.
- E. For medium pressure applications, access panels shall be hinged to implode.
- F. Access doors shall be a minimum of 12" x 12". Label access door for the use it is installed.

2.6 MANUAL DAMPERS:

- A. Volume dampers shall be manually operated, single or multi-blade type with sleeve bearings, galvanized steel interlocking blades and a galvanized steel frame. In ducts over 12 inches deep use multiple opposed blade type, gang operated dampers with a maximum blade width of 8 inches. Fabricate damper blades of 16 gauge steel with hemmed edges, and a maximum length of 48 inches. Damper operating rod shall be full blade length extended through the duct to externally mounted bearing plates. All insulated ductwork bearing plates shall be flush with insulation finish and fastened to the duct; operating lever shall be of the indicating type with locking quadrant.
- B. Furnish and install, where indicated on the drawings or where required, air splitter dampers and/or butterfly dampers with indicating and locking quadrants or push rods and pillow blocks. The dampers shall be two gauges heavier than the ducts in which they are installed. Damper blades shall be riveted to the supporting rod. Splitter dampers shall be sufficiently long to extend the full width of the branch duct to which attached. Where necessary they shall be curved to scoop branch duct air out of the main duct air stream.
- C. Splitter dampers shall also be designed to conform to Figure A of Plate No. 28 of the SMACNA Low Velocity Duct Construction Standards.
- D. Dampers up to 48" x 12" shall be single blade designed to conform to Figures B, C and D, Plate No. 28 of the SMACNA Low Velocity Duct Construction Standards.
- E. Dampers with blade lengths over 48" shall be made in multiple sections with mullions between the sections of blades.

- F. Dampers in duct over 12" height shall be multibladed and designed to conform to Figures B and C of Plate No. 29 of the SMACNA Low Velocity Duct Construction standards.

2.7 TURNING VANES:

- A. All square elbows shall be provided with airfoil shaped turning vanes for noise and directional control.
- B. Vanes shall be installed in accordance with Plate No. 22 of the SMACNA Low Velocity Duct Construction standards.
- C. Vane runners shall be screwed to the vanes; runner assembly shall be spot welded, riveted or screwed to duct sides.

2.8 GRAVITY BACKDRAFT DAMPERS:

- A. Provide gravity backdraft dampers as indicated on drawings complete with frame. Frame shall be of galvanized steel channel construction with corner braces. Damper shall consist of 14 gauge aluminum blades with polyurethane foam edges. Axles shall be of zinc plated steel construction operating in ball bearings.
- B. Blades shall be counterbalanced and field adjustable for a range of .01 to .25 inches static pressure.
- C. Assembly shall be Ruskin Type CBD-4 or approved equal.

2.9 AIR MONITOR STATION:

- A. Each device shall be designed and built to comply with, and provide results in accordance with accepted practice as defined for system testing in the ASHRAE Handbook of Fundamentals as well as the Industrial Ventilation Handbook.
- B. Airflow measuring stations shall be fabricated of heavy gauge galvanized steel welded casing with 90 deg. connecting flanges in a configuration and size equal to that of the duct it is mounted into. Each station shall be complete with an air directionalizer and parallel cell profile suppressor across the entering airstream and mechanically fastened to the casing, equal-area and equal-weighted averaging total pressure sensors and manifold, internal piping, and external pressure transmitter ports. An identification label shall be placed on each unit casing listing model number, size, area, and specified airflow capacity.
- C. Static sensing stations used for sensing the supply (or return) air distribution system static pressure shall be fabricated in accordance with that outlined for airflow measuring stations except that multiple bullet-nose shaped static pressure sensors with averaging manifold shall be furnished in lieu of the total pressure sensors and manifold.
- D. Where multiple stations serve a common fan or fan plenum, coordinate with the temperature control contractor all necessary electronic control devices (velocity pressure transmitters, square root extractors, multipliers, and arithmetic relays) to sum or total the station airflow rates for CFM readout and control signal use.

- E. Where the capacities of un-monitored fans must be used in the resetting of airflow control CFM or CFM setpoints, provide a programmer capable of receiving electric or pneumatic signals indicating the operating status of the fans and developing a control reset signal equivalent to the total air volume of the operating fans, regardless of the sequence of operation of the fans.
- F. The maximum allowable pressure loss through the unit shall not exceed .065" w.g. at 1000 fpm, or .23" w.g. at 2000 fpm. Each unit shall be capable of measuring the airflow rate within an accuracy of 2% as determined by U.S. G.S.A. certification tests shall contain a minimum of one total pressure sensor per thirty-six square inches of unit measuring area.
- G. The units shall have a self-generated sound rating of less than NC40, and the sound level within the duct shall not be amplified nor shall additional sound be generated.
- H. Air monitors at fan inlet shall be Volu-probe type.

PART 3 - EXECUTION:

3.1 LOUVERS

- A. All louvers shall be provided by the General Contractor. This Contractor shall make all connection thereto and install insulated dual wall blank-off as required.

3.2 INSTRUMENT TEST HOLES:

- A. Test holes shall be provided at the following locations:
 - 1. Each discharge duct from air handling units.
 - 2. Each return duct to air handling units.
 - 3. Each fresh air duct to air handling units.
 - 4. Each discharge duct from the duct heating coils.
 - 5. Each discharge duct from air terminal device.

3.3 FIRE DAMPERS:

- A. Install fire dampers where indicated on plans/or as required by the State Fire Marshal or the local Fire Marshal as applicable.
- B. Fire Damper testing Requirements: Prior to occupancy and in the presence of the Engineer, each fire damper shall be tested and shown to be operations.
- C. Should any fire damper be found to be unacceptable and require an additional trip for the Engineer, said trip will be billed to the Contractor in accordance with the regents as defined in the general provisions of the specification.

3.4 COMBINATION FIRE/SMOKE DAMPERS:

- A. Install dampers with sleeve, per manufacturer's recommendation to meet IBC Code. All wiring between operator and air handling unit and BAS interlock shall be the controls sub-contractor's responsibility. The fire alarm contractor will be responsible for the wiring and programming of smoke detectors into the fire alarm panel. Mechanical contractor will be responsible for power wiring from an electrical panel or designated emergency junction box (refer to electrical plans for locations). All wiring shall be in conduit. Electrical contractor will furnish smoke detector for each damper. Installation of detector in duct by mechanical contractor.

3.5 DUCT ACCESS DOORS:

- A. Access panels shall be located at the following installation:
 - 1. All automatic dampers in ductwork.
 - 2. All fire dampers.
 - 3. Smoke detectors.
 - 4. Combination fire/smoke dampers

3.6 MANUAL DAMPERS:

- A. Dampers in exposed ductwork or ductwork accessible from lay-in tile ceilings shall be controlled with quadrants mount on duct walls.
- B. Dampers in concealed ductwork or ductwork not accessible due to plaster ceilings, concealed spline ceilings, etc., shall be provided with an extension and quadrant handle in ceiling enclosed in a box with an enameled cover plate.
- C. Volume dampers shall be located where shown on drawings and as required by the balancing sub-contractor.

3.7 TURNING VANES:

- A. Vanes shall be installed in accordance with Plate No. 22 of the SMACNA Low Velocity Duct Construction standards.
- B. Vane runners shall be screwed to the vanes, runner assembly shall be spot welded, riveted or screwed to duct sides.

3.8 AIR MONITOR STATIONS:

- A. Stations shall be installed in strict accordance with the manufacturer's published requirements. These stations serve as the primary signals for the airflow control systems, therefore it shall be the responsibility of the contractor to verify location and installation to assure the accurate primary signals are obtained.

END OF SECTION 23 33 00

SECTION 23 38 60 – WELDING LAB FUME EXTRACTION SYSTEM

PART 1 - GENERAL

1.1 Summary

- A. 5” diameter x 9’ long, OSHA compliant, positionable, hanging fume arm that installs to an wall mount steel bracket.
- B. Arm is supported with an external frame of 1-inch square finished tube steel and 2 gas spring shocks that hold the position of the arm in place for as long as required by the operator.

1.2 SUMMARY

- A. Section Includes:
 - 1. Welding fume extraction system
 - 2. Related accessories
 - 3. Compliances

1.3 SUBMITTALS

- A. Product Data: Indicate manufacturer's model number, technical data including description of components, filtration efficiency, performance, noise level, accessories and installation instructions.

1.4 QUALITY ASSURANCE

- A. Engage an experienced installer to perform work of this Section who has completed installations similar in design and extent to that indicated for this Project, and who has a record of successful in-service performance.
- B. Engage a manufacturer with minimum 10 years proven U.S. experience in manufacturing Filtration Systems similar to that indicated for this Project and with a record of successful in-service performance.

1.5 COORDINATION

- A. Coordinate layout and installation with other work, including light fixtures, fixed equipment and workstations, HVAC equipment and equipment of movement such as overhead cranes.
- B. Coordinate location and requirements of service-utility connections.

PART 2 - PRODUCT

- 2.1 DIMENSION: 5-Inch Diameter x Minimum 9-Feet Long with 7-foot Reach
- 2.2 ARM ADJUSTMENT AND PARTS: Arm to be externally adjusted and all parts are to be accessed externally. No internal parts are permitted.
- 2.3 ARM BASE: Fabricated steel with powder coat finish. Base is to allow for 360-degree rotation.
- 2.4 ARM SUPPORT: Support structure of the arm is to support the arm when fully extended for as long as required by the operator.
- 2.5 MOUNTING BRACKET: Fabricated steel; powder coat finished
- 2.6 ARM HOOD: Formed steel, powder coat finished with handle. Hood assembly design must allow positioning by the operator where required and the face of the hood must have an inner baffle to increase face velocity.
- 2.7 ARM TUBE: Tube to be 20-gauge anodized aluminum or equal.
- 2.8 ARM HOSE: Arm joints will have hose that is suitable for weld smoke collection. Hose is to have a wire helix support and a minimum 200 degree temperature rating.
- 2.9 ASSEMBLY: Arm to ship boxed and fully assembled with fasteners provided where required; a manufacturer's assembly guide is to be provided.
- 2.10 UNIT COLOR: Refer to plan for color of unit. Tube must be either RED or BLUE based on location within space. No exception. Hood and joint hose shall be black.
- 2.11 WARRANTY: Unit shall carry a 1-year warranty from time of project final completion.
- 2.12 ACCEPTABLE MANUFACTURERS
 - A. Products, which comply with this specification as judged by the Architect/Engineer may be provided by the following manufacturers. All products specified in this section shall be provided by a single manufacturer.
 - 1. Nederman LLC, Diversitech, Lincoln Electric or Carmon Systems

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances, service-utility connections, and other conditions affecting installation and performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide surface/substrate preparation as required by the manufacturer's printed installation instructions. Do not proceed with installation until site is in proper condition to receive the Dust Collector.

3.3 INSTALLATION

- A. Install equipment in accord with manufacturer's written instructions, original design and referenced standards.
- B. Install bracket at 9' AFF such that the hood of the arm can extend to the edge of the welding booth. Refer to plan for location within booth.

3.4 PROTECTION

- A. Provide protection of the completed installation until completion of the project. Repair any damage at no additional cost to Owner.

3.5 WARRANTY

- A. Provide a written warrantee for a period of one year from date of final acceptance for all components.

END OF SECTION 23 38 55

SECTION 23 90 00 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS:

- A. The HVAC contractor shall keep a record copy of the bid set and fabrication drawings at the job site and shall accurately maintain a record with dimensions and elevations of all changes to the contract drawings as the job progresses. At the completion of the job, the HVAC contractor shall submit updated CADD produced mechanical drawings with discs to the Engineer.
- B. Show all valve and equipment numbers.
- C. Provide complete equipment and piping schematics showing all devices and all thermometers and gauges.
- D. Revise all equipment schedules to show actual equipment furnished.

1.2 DEMONSTRATION OF COMPLETE MECHANICAL SYSTEMS:

- A. After installation has been completed, equipment has been tested, systems placed in permanent operation, and all adjustments made, a competent start-up technician shall be provided for a period of seven working days. This technician shall operate the system during this time, and during this time shall instruct the Owner's designated representatives in the operation and maintenance of the equipment. The start-up technician shall be at the site continuously during working hours during the instructional period. Systems to be operated include, but are not necessarily limited to:

1.3 COMMISSIONING OF HVAC SYSTEMS:

- A. The systems will be commissioned in accordance with ASHRAE Guideline. It shall be the responsibility of this contractor to prepare, conduct, supervise, and implement this effort to the satisfaction of the engineer. As part of this phase of work and included in this contract shall be all non-destructive testing and adjustments requested by the engineer.

1.4 OPERATING AND MAINTENANCE MANUALS:

- A. The form in which the operating maintenance manual is to be presented shall be subject to approval by the Architect. Six copies of the manual shall be provided.
- B. The following items, together with any other necessary and pertinent data, shall be included in the manual. This list is not necessarily complete and is only to be used as a guide.
 - 1. Suggested settings of all control and switches for normal operation with description of control and its location.
 - 2. A check list for periodic maintenance of all equipment, with maintenance and cleaning instructions.

3. As built wiring, interlock, and control diagrams for the equipment, with color coding shown on wiring and interlock diagrams.
4. Parts list for all replaceable service parts, and indicate where they may be purchased.
5. Manufacturer's cuts and rating tables for all equipment, including copies of all shop drawings.
6. Oiling, lubricating, and greasing data, showing how to lubricate, frequency, and which lubricants to use.
7. Complete electrical load data from operation tests.
8. Test data on all equipment.
9. Belt sizes, types, and lengths.
10. Serial numbers of all principal pieces of equipment.
11. Valve tag schedule (framed).
12. Manufacturers', suppliers, and subcontractors' names, addresses, and telephone numbers.
13. The first page shall identify project and give name, address and phone number of Architect, Engineer, Mechanical and Electrical sub-contractors and any service companies involved and give name and night phone of each party responsible for service.
14. Copies of the valve tag schedule and wiring diagrams shall be framed under glass and posted in the Equipment Room.

1.5 LABELS, IDENTIFICATION AND TAGS:

- A. All control components for equipment shall be identified using 3/4" high permanent engraved bakelite nameplates - white letter-black background, with minimum 1/4" high letters. Nameplates shall be permanently attached to device or to wall or mounting panel above device.
- B. All equipment including but not limited to compressors, pumps, equipment cabinets shall be identified with yellow 1 inch high letters. Permanent engraved bakelite nameplates - yellow letters - gray background with minimum 1/4 inch high letters. Permanently attach nameplate to equipment.
- C. Tag all valves with 1 inch diameter stamped brass tags numbered in sequence. Tags shall also be identified as to the type of piping. Secure with brass chain.

1.6 VALVE TAG SCHEDULE:

- A. Copies of the valve tag schedule and wiring diagrams shall be framed under glass and posted in the equipment room.

1.7 SPARE FILTERS:

- A. In addition to the set installed immediately prior to occupancy, minimum of three additional complete sets shall be turned over to Owner's representative.

1.8 WARRANTIES:

- A. Deliver to Owner all warranties, guarantees, etc. and obtain written receipts.

1.9 PUNCH LIST:

- A. During construction period the Engineer will issue punch lists. These items shall be completed before Engineer will approve next application for payment. Final punch list work shall be completed before acceptance.

1.10 FINAL INSPECTION AND ACCEPTANCE:

- A. The architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
- B. Submit a list of uncompleted items, if any, and advise when the items will be done.
- C. Complete all items on Architect's or Engineer's prefinal punch list.
- D. Final inspection and tests of the completed construction shall be performed in the presence of the Architect or his representative and shall be at such times as are convenient to the Architect. Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by this HVAC contractor at his own expense.

1.11 FINAL CLEAN UP:

- A. During construction this HVAC contractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises and to remove all evidence of his work.
- B. The HVAC contractor shall resolve all questionable items to be corrected prior to an inspection by the Engineer. If items have not been corrected completely, and additional site visits are required for the Engineer to check for compliance, the HVAC contractor will be billed by the Owner at \$125.00 per hour plus travel expenses for Engineer's services.

1.12 GUARANTEE:

- A. The guarantee shall be as stated in the General Conditions, and the General Provisions of this section.

END OF SECTION 23 90 00

SECTION 26 01 00 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL:

1.1 DESCRIPTION OF WORK:

- A. The work covered by Division 26 of these specifications consists of furnishing all labor, equipment, supplies, and materials, and performing all operations, including trenching, backfilling, cutting, channeling, chasing and patching necessary for the installation of complete wiring systems in accordance with the contract documents.
- B. In addition, the soil boring information included in the specifications or in the drawings is for information to all contractors.
- C. The Contract Drawings indicate the extent and general arrangement of the electrical work. The drawings and specifications shall be considered supplementary, one to the other, so that materials and workmanship indicated, called for or implied by the one and not by the other shall be supplied and installed as though specifically called for by both. All labor and material required to perform all work in conjunction therewith whether or not indicated or specified shall be furnished and installed as part of this work.
- D. The bidding requirements, general conditions of the contract, forms, and Division 01 - General Requirements are part of Division 26 - Electrical.
- E. The electrical subcontractor may also be referred to in this specification as electrical contractor. The electrical contractor may also be referred to in this specification as "this contractor", "contractor" Contractor, or "Division 26 contractor".
- F. See section 26 01 11 for Electrical Outline of Work.

1.2 DRAWINGS AND SPECIFICATIONS:

- A. It is understood that while drawings shall be followed as closely as circumstances will permit, the Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. Anything not entirely clear in the Contract Documents will be fully explained if application is made to the Architect/Engineer in accordance with the General Conditions and Supplements thereto. However, should conditions arise where, in the judgment of the Contractor, certain changes will be advisable, the Contractor shall communicate with the Architect/Engineer and secure his review of these changes before proceeding with the work, provided they are of a major nature.
- B. The drawings are diagrammatic and are not intended to show each and every conductor, fitting, device, conduit, or a complete detail of all the work to be performed, but are for the purpose of illustrating the type system and special conditions necessary for the experienced electrician to take off his material and lay out his work. The Contractor shall be responsible for making such measurements as may be necessary at the Project and adapting his work to the project conditions.
- C. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule or architectural drawings for

material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.

1.3 APPLICABLE SPECIFICATIONS AND STANDARDS:

A. The Contractor shall be familiar with the following specifications and standards, as applicable to the materials and methods specified and shall perform all work in accordance with the specifications and standards, and of the issue year that is required by the Authority Having Jurisdiction for work in this project. If the Contractor encounters situations where the Contract Documents contradict the specifications and standards, the Contractor shall bring it to the attention of the Architect/Engineer.

1. AEIC - American Association of Edison Illuminating Companies
2. ANSI - American National Standards Institute
3. ASHRAE/IES - Standard 90.1 - 2007
4. ASTM - American Society for Testing and Materials
5. ETL - Electric Testing Laboratories
6. IBC - International Building Code with South Carolina adopted Amendments
7. ICEA - Insulated Cable Engineers Association
8. IEEE - Institute of Electrical and Electronic Engineers
9. IESNA - Illuminating Engineering Society of North America
10. NEC - National Electrical Code (NFPA 70) - 2020
11. NEMA - National Electrical Manufacturers Association
12. NESC - National Electrical Safety Code
13. UL - Underwriters' Laboratories Inc.
14. OSHA - Occupational Safety and Health Standards
15. Green Globes
16. State of South Carolina Office of State Engineer (OSE)

B. All referenced manufacturer's requirements and specifications and nationally recognized and accepted standards and specifications shall be the latest edition unless specified otherwise and shall be used as they are applicable for products and craftsmanship incorporated in the Contract Drawings. The references to these standards and specifications do not imply acceptance of any and all products described in the standards and specifications.

1.4 APPLICABLE REGULATIONS:

A. The installation shall comply with the applicable rules of the 2020 National Electrical code and rules and regulations of the IBC 2018 and ASHRAE 90.1-2007. In no case shall the materials and workmanship fail to meet the minimum requirements of the National Electrical Code.

B. An electrical inspection certificate shall be issued by the inspection authority having jurisdiction before work is to be approved for final payment.

1.5 SUBMITTALS:

A. All submittals shall be reviewed, corrected as necessary prior to submitting to Architect/Engineer and stamped "Approved" by the contractor.

B. Materials List:

1. As soon as practicable and within 7 days after the date of award of contract and notice to begin work, and before commencement of installation of any materials or equipment, submit six copies of a complete schedule of the materials and equipment proposed for installation and of names of specialty subcontractors for approval by the Architect/Engineer.
2. The schedule shall, as soon as possible, be supplemented by catalog cuts, diagrams, lighting fixture brochures, shop drawings, field working drawings and such descriptive data as may be required by the Architect/Engineer. In the event any items of materials or equipment contained in the schedule fail to comply with the specification requirements, such items will be rejected.
3. Where shop drawings are called for in other sections of the specifications, the list shall name the manufacturer and item and state "Shop Drawings to Follow."
4. Orders for all approved items shall be placed by the contractor within two weeks after the list is returned to him by the Architect. The Architect/Engineer shall be notified immediately - in writing, of delivery scheduling of the material not ordered for immediate shipment. The first payment estimate will not be approved until the Architect/Engineer is satisfied that all material is ordered and delivery scheduled so that there will be no delay to the job because of getting material. The contractor may be required to remove and replace at his own expense any material installed before approval.

C. Shop Drawings:

1. Shop drawings shall be submitted conforming to the requirements stated in Division 01 - General Requirements and supplementary general conditions for the following items:
 - a. Lighting Fixtures including lamps and ballasts
 - b. Seismic Attachments
 - c. Additional items and systems as specified in technical sections

D. Field Coordination Drawings:

1. Submit field coordination drawings in cooperation with mechanical contractor, as specified in Section 230100. Include, as applicable, lighting fixtures, conduit larger than 1 inch diameter, and groups of 5 or more conduits (any size). The drawings shall be produced with a $\frac{1}{4}'' = 1 \text{ ft.}$ scale and shall utilize a separate color for each trade. Although these drawings are not required to be prepared at $\frac{1}{4}'' = 1 \text{ ft.}$ scale.
2. Submit $\frac{1}{4}$ inch – 1'-0" scaled plans of each electrical equipment room indicating locations of electrical gear, sleeves and conduit penetrations.

E. Installation Instruction:

1. Submit to the Architect/Engineer manufacturer's installation, operation and maintenance instructions for all electrical protective or operable equipment immediately after the completion of the job. Submit four copies of complete manufacturer's instructions, other than shop drawings, for the following equipment.

- a. Lighting fixtures

F. Operation and Maintenance Manuals:

1. See General Conditions and Supplements thereto. The contractor shall compile and bind 3 sets of all operation and maintenance manuals, equipment and parts lists, instructions, and descriptive literature furnished by the manufacturers of the furnished equipment to assist in the proper maintenance and operation of equipment. These instructions shall be turned over to the architect with application for final payment, and final payment will not be made until received. Each brochure shall include 1 copy of each of all approved shop drawings, catalog pages, instruction sheets, operating instructions, installation and maintenance instructions, and spare parts bulletins. Refer to Section 269000 for additional requirements.

1.6 EQUIPMENT SIZES:

- A. Listing of a manufacturer as a source of acceptable equipment does not relieve the contractor and the manufacturer of this equipment from the requirement of meeting all aspects of the contract documents including that of having to fit the equipment in the space allocated.

1.7 WARRANTY:

- A. The electrical contractor shall guarantee by his acceptance of this contract that all work installed will be free from any and all defects in workmanship and/or materials and that all apparatus will develop capacities and characteristics specified.
- B. Refer to General Conditions of the Contract and Supplemental to General Conditions for guarantee period.
- C. Refer to individual specification sections for special warranty for certain products and systems.

1.8 SITE INSPECTION:

- A. Each electrical bidder shall visit the site of the work and familiarize himself with the character and conditions of the job site. The Contractor shall not be excused from doing required work because he did not visit the site.

1.9 RECORD DRAWINGS:

- A. The Contractor's competent supervisor shall maintain on the job site one complete set of contract documents of all trades, and shall coordinate with other trades so as to avoid conflicts. The A/E field representative will visit the contractor's office periodically and

shall be allowed to inspect the record set of drawings to verify that they are being kept up to date.

- B. The Contractor shall provide one set of marked plans to Architect/Engineer for his preparation of record drawings. The marked plans shall indicate all changes and deviations from the original contract documents. Each change shall be marked in a clear, legible manner, keying it to the appropriate change order, clarification note, or field authorization note, as applicable. The use of the field coordination drawings as the record drawings is not acceptable.

1.10 TEMPORARY FACILITIES:

- A. Shall be provided as required by the general conditions of the contract.

1.11 CONSTRUCTION UTILITIES:

A. GENERAL REQUIREMENTS OF THE CONTRACT

1. CONCRETE WORK: Concrete work for electrical equipment foundations, curbs, bases, pads, and pedestals shall be provided under Division 26 in conformance with Division 03 - Concrete. Any required concrete tests shall be paid by this contractor.
2. METAL FABRICATIONS: Steel frames, supports and metal assemblies necessary for the installation of electrical systems shall be provided under Division 26 in conformance with Section 05 50 00 - Metal Fabrications.
3. PAINTING:
 - a. All required painting of electrical conduit and items specified under Division 26 - Electrical shall be done under Division 09 - Painting, except as noted below.
 - b. Any electrical item factory painted that has a damaged or abraded area shall be touched-up to match surrounding finish unless it is rejected by the Architect/Engineer. Touch-up painting shall be done by Division 26 subcontractor at the expense of the electrical contractor.
 - c. Provide prime and finish painting of all exposed conduit and wireway not being painted by General Contractor.

1.12 ABBREVIATIONS:

- A. The following abbreviations may be found in this specification and in the drawings.

- | | | |
|----|-------|---|
| 1. | A | Ampere |
| 2. | AC | Alternating Current |
| 3. | A/E | Architect/Engineer (Also referred to as the "Engineer") |
| 4. | AEIC | Association of Edison Illuminating Companies |
| 5. | AHJ | Code Authority Having Jurisdiction |
| 6. | ANSI | American National Standards Institutes, Inc. |
| 7. | ASTM | American Society for Testing and Materials |
| 8. | ASYMM | Asymmetrical |

9.	AV	Audiovisual Systems
10.	AWG	American Wire Gauge
11.	C	Conduit
12.	CBM	Certified Ballast Manufacturers
13.	CFM	Cubic Feet per Minute
14.	DB or dB	Decibel
15.	DC	Direct Current
16.	EMT	Electric Metallic Tubing
17.	ETL	Electric Testing Laboratories
18.	F	Fuse or Farenheit, as applicable
19.	GFI	Ground Fault Interrupter
20.	HZ	Hertz
21.	IEEE	Institute of Electrical and Electronic Engineers
22.	IMC	Intermediate Metal Conduit
23.	KCMIL	Thousand Circular Mil
24.	KV	Kilovolt (1000-volt)
25.	KVA	Kilovolt Ampere
26.	MA	Milliampere
27.	NEC	National Electrical Code
28.	NEMA	National Electrical Manufacturers Association
29.	NFPA	National Fire Protection Association
30.	NOC	Normally Open Contact
31.	NCC	Normally Closed Contact
32.	OSE	South Carolina Office of State Engineer
33.	PVC	Polyvinyl Chloride
34.	RMC or GRC	Rigid Metal Conduit
35.	RMS	Root Mean Square
36.	RNMC	Rigid Non-Metallic Conduit
37.	RS	Rapid Start
38.	SPD	Surge Protective Device
39.	SYMM	Symmetrical
40.	TVSS	Transient Voltage Suppressor System (same as "SPD")
41.	UL	Underwriters' Laboratories, Inc.

PART 2 - PRODUCTS:

2.1 MATERIALS:

- A. All materials used in this work shall be new unless otherwise noted. All materials used on this project shall be listed and labeled by one of the third party agencies which have been approved by the code authority having jurisdiction to safety test and label electrical and mechanical equipment. Any material installed that is not labeled shall be subject to a field evaluation by one of these approved agencies, at the contractor's expense, if requested by the authority having jurisdiction or the Engineer. Any item not approved by the agency shall be replaced by the contractor at his expense. It shall be the contractor's responsibility to verify that materials specified or used on the project are labeled.
- B. Catalog numbers and trade names in these specifications and noted on the drawings are intended to describe the material, devices or apparatus wanted and not to limit competition.
- C. Where "or equivalent as accepted by the Architect/Engineer" is specifically noted in the specifications, reference to any article, device, product, material, fixture, or type of

construction by name, make or catalog number, such reference shall be interpreted only as establishing a standard of quality and shall not be construed as limited competition. The Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is acceptable as equivalent to that specified.

- D. The contractor shall immediately upon request present samples and test data from a recognized independent testing laboratory of the proposed substitute items so that the Architect's judgment may be based upon comparison of actual items rather than just catalog cuts.
- E. The Architect/Engineer may request that the Contractor provide full sized model of the proposed material or assembly, at a location convenient to the Engineer/Architect for a complete evaluation. All presentations shall be made by the Contractor's representative and not by the representative of the manufacturer of the equipment.
- F. Materials from listed manufacturers shall only be acceptable if they can properly fit in the allocated spaces without interference from building walls, ceilings, piping conduit, ducts or other equipment.
- G. The contractor, through the manufacturer of the equipment specified here shall review the use, details, and methods of installation of this product as indicated and shall disclose to the Architect any and all deviations from his recommended use and method of installation and shall also disclose to the Architect his recommendations for the use and method of installation of his product to achieve the intended purpose and result. Such disclosure shall be made within the time stipulated for submission of shop drawings.

PART 3 - EXECUTION

3.1 DIMENSIONS:

- A. Electrical equipment, fixtures and plans are not to be scaled. Necessary dimensions shall be obtained from architectural and structural drawings. If work is being done within existing buildings or structures, verify by field measurements all dimensions and plans shown on drawings.

3.2 INSPECTIONS:

- A. Contractor shall cooperate with architect/engineer during the performing of project inspections. Open and close equipment doors as required to gain access to equipment for inspection by the architect/engineer. Provide qualified electricians to assist architect/engineer during inspections.

3.3 SUPERVISION AND COORDINATION:

- A. The Contractor shall have in charge of the work at all times during construction a thoroughly competent foreman with extensive experience in the work to be performed under this contract. Anyone deemed not capable by the Architect/Engineer shall be replaced immediately upon request, and after a satisfactory foreman has been assigned, he shall not be withdrawn without the written consent of the Engineer.

- B. Installation of electrical conduits, boxes and equipment shall not interfere with access to HVAC and plumbing equipment, its controls or its maintenance. Likewise, electrical boxes and equipment shall be located at accessible locations complying with NEC.
- C. The Contractor shall coordinate the work under his contract as to avoid conflicts between his work and the work of other trades. Contractor shall carefully examine the drawings prior to running any conduit and shall be responsible for the proper fittings of materials and equipment into the space provided prior to installing any conduit or equipment in accordance with requirements of the National Electric Code. If any departures from the contract drawings are deemed necessary by the Contractor, detail drawings of such departures and the reasons therefore shall be submitted as soon as practicable to the Architect/Engineer for his review. No such departures shall be made without this review and written clarification or change order.
- D. Submit field coordination drawings as specified in Section 26 01 00, Part 1. Requirements stated on "Fabrication Drawings" paragraph of Section 26 01 00 shall apply. These drawings are intended to reflect actual installation of mechanical and electrical systems. Electrical items interfering with work under other trades shall be relocated as required to avoid conflict, at no extra cost to the Owner or its agents. No rough-in shall be accomplished until these drawings have been approved by the A/E.
- E. Electrical Contractor shall cooperate with other contractors and subcontractors to allow for the installation of their work as well as his own.
- F. The Electrical Contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this Contractor without regard for the work of others, or if a conflict results, must be changed as directed by the Architect/Engineer without additional cost to the Owner.
- G. Conduit shall be installed in a way that does not weaken, or interfere with, the structural system for the building.
- H. Relocation of outlets, equipment, conduit, system connections or rough-in locations up to twenty feet, if necessary, in any direction shall be done at no additional cost to the Owner or its agents if identified as required, or communicated to the contractor, before roughing-in.
- I. Coordinate with HVAC, Plumbing and Fire Protection Contractors to assure that no pipe or duct is run above panelboard or switchboard, prior to the installation of this equipment, except as otherwise noted. Piping that is unavoidable shall only be permitted if it allows for clear 6'-0" space above the equipment after being protected with drip pan that shall be provided by this contractor. Inform Architect/Engineer of any case where there is conflict.
- J. The contractor shall verify that the electrical equipment to be installed fits in the assigned space prior to running any conduit or installing the equipment. Any potential conflict shall be brought to the attention of the A/E at once.
- K. The Architect/Engineer reserves the right of observing all concealed work, before being covered. This Contractor shall notify the Architect/Engineer of the need of a job observation at least four working days prior to concealment of work.

- L. Requests for information (RFI) answers provided by the A/E to contractor's RFI's do not constitute authorization to change the requirements of the contract documents. The contractor shall submit a change order request for consideration by A/E for any equipment, material, wiring method, or other work that as a result of the outcome of an RFI, may require changes from the original contract documents. No deviation from the original contract is authorized until the change order request is approved.

3.4 SCHEDULE OF WORK:

- A. Work under Division 26 - Electrical shall be phased and scheduled to satisfy construction manager, general contractor, plumbing contractor, HVAC contractor, and fire protection contractor's approved schedule of work.

3.5 CUTTING AND PATCHING:

- A. This Contractor shall do all cutting and patching necessary for the proper installation of his work and shall repair any damage done by himself or his workmen.
- B. Required excavation for installation of all electrical work shall be provided by the electrical contractor and replacement and compaction shall be performed according to other specifications relating to the particular type of work.

3.6 WASTE MATERIALS:

- A. The Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by his employees or work and shall cleanup scraps and seep floors each day workers are at the job site. At the completion of the work he shall remove all leftover materials, equipment and debris resulting from the work done under this Division.
- B. Waste that is classified by law, state or Federal agencies as hazardous or toxic, like fluorescent lamps, ballasts, or other equipment containing PCB's, shall be discarded through bonded hazardous waste disposal facilities utilizing methods prescribed by law.

3.7 TESTS:

- A. Refer to Section 260235 – Electrical Testing.

3.8 NOISE AND VIBRATION CONTROL:

- A. Certain parts of the electrical system shall be provided with noise and vibration control as specified in Section 260140. In case of conflict between this section requirements and requirements of other Division 26 sections, Section 26 01 40 requirements shall prevail.

3.9 FIREPROOFING:

- A. It is the responsibility of this contractor to provide all additional fire proofing required to maintain the fire resistance integrity and rating of floors, walls and ceilings that may be compromised by the installation of conduits, raceways, boxes and electrical cabinets.

END OF SECTION 26 01 00

SECTION 26 01 11 - ELECTRICAL OUTLINE OF WORK

PART 1 - GENERAL

1.1 NOTE:

- A. Validate with Construction Manager the Division of Work described here prior to bidding project.

1.2 BUILDING WORK:

- A. Electrical building work shall include all work that is specified as part of Divisions 26 and 28 including, but not necessarily limited to:
- B. General Requirements: The following is an outline of the systems intended to comprise the electrical interior work. Refer to the entire construction documents for complete requirements.
 - 1. Branch circuits, including conduits, conductors, outlets, boxes, and fittings
 - 2. Lighting fixtures including lamps and drivers
 - 3. Grounding systems

END OF SECTION 26 01 11

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL:

1.1 SCOPE:

- A. Grounding and bonding of the electrical system.

1.2 RELATED SECTIONS:

- A. Section 26 05 19 - Low Voltage Electrical Conductors

1.3 GENERAL:

- A. The conduit and neutral conductors of the wiring systems and all electrical equipment shall be grounded.
- B. Each conductive, non-current carrying, part of the electrical system shall be bonded to an equipment grounding conductor sized in accordance with NEC.
- C. The raceway system shall not be relied on for ground continuity. A green grounding conductor, properly sized per NEC Table 250-122, shall be run in all raceways to ground each conductive, non-current carrying part of the electrical system. Exceptions are as follows:
 - 1. Raceways for telecommunications.
 - 2. Raceways for data.
 - 3. Raceways for audiovisual conductors.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. All products shall be new and listed for the use intended.
- B. Equipment grounding conductors shall be colored green and shall have 600 volt insulation and shall be as specified in Section 26 05 19.
- C. Grounding conductors, where insulated, shall be colored solid green. Conductors intended as neutral shall be colored solid white on 120/208V circuits and natural gray on 277/480V circuits.

PART 3 - EXECUTION:

3.1 GENERAL

- A. Boxes with concentric, eccentric or oversized knockouts shall be provided with bonding bushings and jumpers. The jumper shall be sized per NEC Table 250-66 and lugged to the box.

END OF SECTION 26 05 26

SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Work Included: Work under this Section includes but is not necessarily limited to the following:
 - 1. Supports and fastenings required for properly mounting of boxes, raceways, electrical equipment and fixtures.
- B. Electrical raceways, equipment and fixtures shall include the following items to the extent required on plans or in other sections of these specifications:
 - 1. Conduit and boxes
 - 2. Lighting fixtures

1.2 RELATED SECTIONS

- A. Include the following sections:
 - 1. Section 26 05 48 – Vibration and Seismic Controls for Electrical Systems

1.3 APPLICABLE PUBLICATIONS:

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
 - 1. Federal Specifications (Fed. Spec.)
 - a. RR-W-401F Wire Rope and Strand
 - 2. American Society of Mechanical Engineers (ASME) Standards.
 - a. B18.2.1 Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws
 - b. B18.2.2 Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts
 - 3. American Society for Testing and Materials (ASTM)
 - a. A307 Carbon Steel Bolts, Studs and Threaded Rod
 - b. A576 Steel Bars, Carbon, Hot-Wrought, Special Quality
 - c. F3125 High Strength Structural Bolts
 - 4. Underwriters Laboratories, Inc., (UL) Standards
 - a. Building Materials Directory
 - b. UL57 Electric Lighting Fixtures

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Steel Supports: Provide brackets, frames, and hangers fabricated from standard rolled structural steel shapes or prefabricated systems manufactured by one of the following:
 - 1. Kindorf Electrical Products Co.
 - 2. Powerstrut Division/Van Huffel Tube Corp.
 - 3. Unistrut Corporation

2.2 WALL ANCHORS:

- A. Interior Masonry or Concrete Walls: Expansion bolt anchors designed to match the load, seismic requirements and type wall construction, but not smaller than 3/8".
- B. Exterior Precast Concrete Walls: Expansion bolt anchors with penetrations limited as approved by Architect.
- C. Interior Dry Walls: Toggle bolt anchors designed to match the load and seismic requirements, but not smaller than 3/8".

2.3 BEAM ANCHORS:

- A. Install expansion bolt anchors designed to match the load and seismic requirements.
- B. All anchor holes drilled in reinforced concrete beams or concrete joists shall avoid cutting the reinforcing bars.
- C. All heavy loads such as transformer trapeze anchors shall be reviewed with the Architect prior to installation.
- D. Manufacturer of anchor bolts, toggles, etc., shall be ITT Philips (Red-Head), Ackerman Johnson, Rawlplug Co., or approved equal.

2.4 RODS:

- A. Provide threaded steel rods, where required, size as required by load and seismic requirements but not less than 1/4 inch diameter. Use hot-dip galvanized steel on installation exposed to the weather. Do not use chain except where detailed or specifically required. Do not use perforated strap or wire.

2.5 BOLTS AND NUTS:

- A. Squarehead bolts and heavy hexagon nuts, ANSI B18.2 and ASTM A307 or A576.
- B. Bolts, underground, ASTM A325.
- C. Sway brace details shall conform to all applicable requirements of MSS Pub. SP-58 cited herein.
- D. Guy wires shall conform to Fed Spec. RR-W-410, as follows:

1. 5/32" diameter - Type V, Class 1
2. 3/16" to 5/16" diameter - Type V, Class 2
3. 1/4" to 5/16" diameter - Type I, Class 2

E. Lighting fixtures and supports shall conform to UL 57.

PART 3 - EXECUTION:

3.1 PREPARATION:

- A. Prior to installation of hangers, supports, anchors, and associated work, the contractor shall meet at the project site with Construction Manager, installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section and Architect/Engineer for purposes of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified.

3.2 INSTALLATION:

- A. Anchors and fasteners shall be installed in accordance with the manufacturer's directions. Necessary holes shall be drilled with drills recommended by the manufacturer and shall be of the recommended diameter and depth. The drilled holes shall be left rough, not reamed, and shall be free from any drill dust. Screws installed in wood or other material shall be so located as to be such distance away from joints as not to be loosened upon opening of joints with shrinkage of the material. Screws, bolts, nuts, or other devices used with anchors or fasteners shall have standard threads and heads and be of a type and size recommended by the manufacturer of the particular anchor or fastener being used.

3.3 RACEWAYS:

- A. EMT, IMC and rigid conduit supports shall be provided at least every 8' and within 3' of each outlet box, junction box, cabinet or fitting.
- B. All pipe supports shall be of type and arrangement as hereinafter specified. They shall be so arranged as to prevent excessive deflection and avoid excessive bending stresses.
- C. Provide all steel and concrete required for support and anchoring of pipes other than shown on Structural or Architectural Drawings.
- D. A/E shall approve method of hanging before work is started. This contractor shall bear all responsibility for materials and workmanship as described in this section and shall make sure that all hangers and supports are properly and permanently connected to building structure.
- E. All supports shall be designed to avoid interference with other conduit, hangers, ductwork, building structures and equipment.

3.4 SAFE WORKING LOAD:

- A. To compensate for variations in products and job conditions, anchors and fasteners, including screws, bolts, or other devices used with them, shall have a minimum safe working load of 1/4 of the holding power. The holding power of an anchor or fastener

shall be based upon laboratory test and certified by the manufacturer. Safe working load may also be determined as 1/4 of a proof test load. A proof test load is a predetermined load that an anchor or fastener must support without failure. The actual holding power might be greater than the proof load.

- B. The type of anchor or fastener to be used shall be designed and intended for use in the base supporting surface to which the item or support is to be attached. As a general rule, wood screws should be used on wood, masonry anchors on concrete or brick, toggle bolts or similar on hollow or thin units, and machine screws, bolts, or welded studs on steel. Some anchors and fasteners are intended for and may be used on more than 1 base material. For example, some anchors intended for concrete may apply also to hollow masonry units. Other anchor and fastening devices specifically designed for the purpose may be used for their intended application. These include concrete inserts, continuous slot channels, beam clamps, friction, and spring clamps, etc.

3.5 ATMOSPHERE:

- A. Anchors and fastenings and screws, bolts, or other devices used with them, shall have corrosion resisting characteristics for the atmospheric conditions in which they are installed. When anchors and fastenings do not inherently have the necessary protection or the protection is lost during installation, they shall be coated to furnish protection sufficient for the atmosphere. If it is not possible to provide protective coatings, such anchors or fasteners shall not be used.

3.6 RESTORATION OF STRUCTURAL AND BUILDING FIREPROOFING:

- A. Restore to original condition any portion of structural or building fireproofing material damaged or removed during the installation of fastener or supports.

3.7 ANCHOR BOLTS:

- A. Equipment requiring seismic attachments shall be anchored to satisfy Section 26 05 48 requirements.
- B. Equipment not requiring seismic attachments shall be anchored as specified here. Floor or pad mounted packaged electrical equipment shall have a minimum of 4 anchor bolts securely fastened through bases. Anchor bolts shall have straight length equal to at least 10 times the nominal diameter of the bolt and shall conform to the following table of sizes for various equipment weights.
- C. Anchor bolts which exceed normal depth of equipment foundation piers or pads shall either extend into concrete floor, or the foundation shall be increased in depth to accommodate bolt lengths.

3.8 LIGHTING FIXTURES:

- A. Provide fixtures and support suitable to withstand seismic disturbances without damage, as required by IBC. Support other fixtures as specified here.
 - 1. Suspension systems for light fixtures, as installed, that are free to swing a minimum of 45 degrees from the vertical in all directions without coming in contact with other parts of the building, and will withstand, without failure, a

force of not less than 4 times the weight it is intended to support will be acceptable.

2. Suspended light fixture shall be supported individually by chains, one chain per corner, supported from overhead structure.

END OF SECTION 26 05 29

SECTION 26 05 31 - CONDUIT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Electrical conduit and tubing systems for power and low voltage applications.

1.2 GENERAL:

- A. All wiring shall be in rigid galvanized metal conduit, 'RMC', except as otherwise noted.
- B. Rigid steel, or intermediate metal conduit shall be used in all areas of the project except as otherwise noted.
- C. EMT may be used in the following applications for power and telecommunication circuits:
 - 1. Concealed in dry construction walls and above ceiling in dry locations
 - 2. Exposed in dry locations above 8'-0" above floor
- D. Flexible metallic conduit shall not be used as a wiring method, other than when specifically noted to be used, without prior permission of Owner.
- E. MC cable is not allowed in this project.

1.3 APPLICABLE SPECIFICATIONS AND STANDARDS:

- A. The materials specified here shall meet the following specifications and standards in their current edition.
 - 1. UL Standards:
 - a. UL 1 Flexible Metal Conduits
 - b. UL 6 Rigid Metal Conduit
 - c. UL 1242 Intermediate Metal Conduit
 - 2. ANSI Standards:
 - a. ANSI C80.1 Rigid Steel Conduit, Zinc Coated

PART 2 - PRODUCTS

2.1 RACEWAYS:

- A. General: Minimum size conduit shall be ½ inch, except as otherwise noted for telecommunications.
- B. Rigid Metal Conduit:
 - 1. Rigid metal conduit shall be schedule 40, of the best quality steel.

2. The interior and exterior surfaces of the conduit shall be protected with a metallic zinc coating. Rigid steel conduit shall be galvanized by the Hot-Dip process in accordance with ASTM A 123.
 3. Fittings for 'RMC' shall be threaded type, UL listed.
- C. Electric Metallic Tubing:
1. Electrical metallic tubing shall be metal conduit of the thin-wall type in straight lengths, elbows or bends for use as raceways for wire or cables in an electrical system.
 2. Electrical metallic tubing shall utilize zinc coated steel, or malleable iron, compression, or set screw, threadless fittings. No Zinc alloy fitting allowed.
 3. Provide EMT connections with insulated throats.
- D. Flexible Metallic Conduit:
1. Flexible metallic conduit shall conform to UL standard 'Flexible Steel Conduit'. All steel used in the fabrication of the conduit shall be zinc coated.
 2. Liquid-tight flexible steel conduit shall be provided with a protective jacket of polyvinyl chloride extruded over a flexible interlocked galvanized steel core to protect wiring against moisture, oil, chemicals and corrosive fumes.
 3. Flexible conduit connectors shall be UL listed T & B nylon-insulated "Tite-Bite", or equivalent from "Blackhawk."
 4. Use flexible metallic conduit for final connection to mechanical equipment, transformers, and light fixtures. Use liquid-tight flexible metallic conduit for final connections to outdoor equipment and in the kitchen. Provide liquid-tight connectors.
- E. Intermediate Metal Conduit:
1. Intermediate metal conduit 'IMC' shall be zinc coated steel, UL listed and labeled.
 2. Fittings shall be the same type as for 'RMC.'

PART 3 - EXECUTION:

3.1 INSTALLATION OF CONDUIT AND TUBING:

- A. See Section 26 05 29 for additional support requirements.
- B. Metallic raceways shall not be stored exposed to the weather.
- C. Conduits shall be concealed within the walls, ceilings, and floors, where possible, and shall be kept at least 6 inches from parallel runs of flues, steam pipes, or hot water pipes. Exposed runs of conduit or tubing, and conduit or tubing run above suspended ceilings,

shall have supports spaced not more than 8 feet apart and shall be installed with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings with right-angle turns consisting of cast metal fittings or symmetrical bends. All raceways shall be run in a neat and orderly fashion. Conduits or tubing run in diagonal or disorganized way shall be removed from the premises if so instructed by the A/E. Bends and offsets shall be avoided where possible, but where necessary shall be made with an approved hickey or conduit bending machine. Conduit or tubing which has been crushed or deformed in any way shall not be installed.

- D. Conduit and tubing shall be supported on approved types of galvanized wall brackets, ceiling trapezes, strap hangers, or pipe straps, secured by means of toggle bolts on hollow masonry units, expansion bolts in concrete or brick, machine screws on metal surfaces, and wood screws on wood construction. Nails shall not be used as the means of fastening boxes on conduits. Wooden plugs inserted in masonry or concrete shall not be used as a base to secure conduit supports.
- E. Conduits shall be installed in such manner as to insure against trouble from the collection of trapped condensation, and all runs of conduit shall be arranged so as to be devoid of traps where feasible. The contractor shall exercise the necessary precautions to prevent the lodgment of dirt, plaster, or trash in conduit, tubing, fittings, and boxes during the course of installation by the use of T & B pushpennies, appleton pennies, or equal closures. A run of conduit or tubing which has become clogged shall be entirely freed of these accumulations or shall be replaced.
- F. Conduit shall be securely fastened to all sheet metal enclosures with double galvanized locknuts and insulated bushings, care being observed to see that full number of threads project through to permit the bushing to be drawn tight against the end of conduit, after which the locknuts shall be made up sufficiently tight to insure positive ground continuity between conduit and box.
- G. Double locknuts shall be used where insulated bushings are used. Insulated bushings of molded bakelite shall be used on all conduit entrances, one inch over in size, into junction boxes, panel boxes and motors starters having sheet metal enclosures. Galvanized steel insulated throat fittings shall be used for EMT work.
- H. Standard size conduit bodies, type LB, LR, LL, etc., shall not be used on 1 1/4" or larger conduits containing power conductors. Where required, pull boxes shall be used. Where pull boxes can not physically be installed, the use of oversized conduit bodies may be acceptable, provided the distance between each raceway entry shall not be less than six times the trade diameter of the largest raceway.

3.2 NOISE SEAL

- A. Seal with appropriate caulking material any conduit penetration through non-rated wall to attenuate sound transmission.
- B. Provide sealing material to limit air movement and sound via electrical conduits penetrating mechanical or electrical rooms. Also, provide seals in conduit between two outlet boxes in different rooms when conduit length is less than 24". Sealing material shall be Permagum by Virginia Chemical. Install 1" of Permagum in space between conduit and conductors.

3.3 EXPOSED RACEWAYS:

- A. Run exposed raceway as high as possible along structural members to minimize visibility. Paint all exposed raceway to match color of surrounding surfaces.

3.4 CONDUIT CAPS

- A. Provide threaded caps on any conduit sleeve, or empty conduit. In addition, provide watertight plugs or fittings if conduit or sleeve is exposed to weather or water runoff.

3.5 CONDUIT ON ROOF

- A. Conduit on roof is not allowed as a wiring method unless otherwise specifically noted on the drawings, and for the minimum required to accomplish connection to the HVAC roof mounted equipment. Do not run conduit on roof that will be visible from grade level. Do not run conduit on roof that will present a tripping hazard. Do not run conduit on roof that could have been run within building, or overhead on roof structures. Conduit that must be run on roof will be IMC or RMC supported on UV resistant, waterproof, rubber support blocks, suitable for membrane roof, with galvanized steel channel on top. Minimum installation height from bottom of conduit to roof surface shall be 5-inches. Branch circuit conductors within conduit installed on roof shall be increased in size from what is shown on drawings to comply with NEC Table 310.15(B)(6)(c) derating requirements. Do not use liquid tight flexible metallic conduit except for final connection to equipment.

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

END OF SECTION 26 05 31

SECTION 26 05 48 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Specification Section 26 01 00 – Basic Electrical Requirements, Drawings, and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 GENERAL

- A. Provide seismic supports and seismic restraints for electrical equipment and electrical materials, as required, to the extent required by the IBC.

1.3 SUMMARY

- A. This Section includes the following:
 - 1. Isolation pads.
 - 2. Spring isolators.
 - 3. Restrained spring isolators.
 - 4. Channel support systems.
 - 5. Restraint cables.
 - 6. Hanger rod stiffeners.
 - 7. Anchorage bushings and washers.
- B. Related Sections include the following:
 - 1. Section 26 05 29 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

1.4 DEFINITIONS

- A. The IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

1.5 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
 - 1. Site Class as Defined in the IBC: D.
 - 2. Risk Category: II
 - 3. Seismic Design Category: D

1.6 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
 - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated an agency acceptable to authorities having jurisdiction.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
 3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.
- B. Delegated-Design Submittal: For seismic-restraint details required to comply with IBC, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
 - a. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.
 2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
 3. Field-fabricated supports.
 4. Seismic-Restraint Details:
 - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events.

1.7 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.
- B. Qualification Data: For professional engineer.

- C. Welding certificates.
- D. Field quality-control test reports.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SEISMIC-RESTRAINT DEVICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - a. Amber/Booth Company, Inc.
 - b. California Dynamics Corporation.
 - c. Cooper B-Line, Inc.; a division of Cooper Industries.
 - d. Hilti Inc.
 - e. Loos & Co.; Seismic Earthquake Division.
 - f. Mason Industries.
 - g. TOLCO Incorporated; a brand of NIBCO INC.
 - h. Unistrut; Tyco International, Ltd.
- C. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency acceptable to

authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- D. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- E. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- F. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.
- G. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.
- H. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.
- I. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- J. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- K. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.2 FACTORY FINISHES

- A. Finish: Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
 1. Powder coating on springs and housings.
 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
 3. Baked enamel or powder coat for metal components on isolators for interior use.
 4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Equipment and Hanger Restraints:
 - 1. Install restrained isolators on electrical equipment.
 - 2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
 - 3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.
- B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- D. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation.

Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.

4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in 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.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
 5. Test to 90 percent of rated proof load of device.
 6. Measure isolator restraint clearance.
 7. Measure isolator deflection.
 8. Verify snubber minimum clearances.
 9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Adjust isolators after isolated equipment is at operating weight.

- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 26 05 48

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit or outlet.
- B. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined above. This includes covers on boxes above lift-out and other type accessible ceilings.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Affix nameplates to plates or equipment utilizing manufacturer's supplied mounting provisions when available, pop rivets or other suitable means approved by the A-E.

END OF SECTION 26 05 53

SECTION 26 50 00 – BUILDING LUMINAIRES

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section Includes:
 - 1. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.

1.2 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 SUBMITTALS

- A. Shop drawings, product data, assembly drawings, wiring diagrams, performance, maintenance data, etc. shall be submitted in accordance with the provisions of specification Section 26 01 00
- B. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
 - 5. Photometric data and adjustment factors based on laboratory tests.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 - b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- C. Shop Drawings: For nonstandard or custom luminaires.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
- D. Product Schedule: Refer to drawings for luminaires, light engines and drivers.
- E. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved, as applicable:

1. Luminaires.
 2. Structural members to which equipment and or luminaires will be attached.
 3. Moldings.
- F. Qualification Data: For testing laboratory providing photometric data for luminaires.
- G. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- H. Product Certificates: For each type of luminaire.
- I. Sample warranty.
- 1.4 QUALITY ASSURANCE
- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.
- 1.6 WARRANTY
- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty for products specified here shall be in accordance with the requirements stated in the General Condition and Supplementary Conditions of the Contract.
- C. Special Warranties: Manufacturer's standard form in which manufacturer of specified lighting unit agrees to repair or replace components of such lighting unit that fail in materials or workmanship within specified warranty period.
1. Warranty Period for LED Electronic Driver: 5 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining 4 years.
 2. Warranty period for LED Luminaires: Manufacturer and luminaire distributor agree to repair or replace LED luminaires that fail during the warranty period as qualified here:
 - a. The requested warranty for LED light engine and driver is a full 7-year warranty for parts and labor from the date of substantial completion.
 - b. Warranty for fixture paint, lens, de-coloration or corrosion is three years from the date of substantial completion.
 - c. The warranty for LED luminaires is a full warranty. The warranty is for an installation as defined by the Contract Documents for this specific building.
 - d. The method of switching used for the LED luminaires shall not reduce in any way the required 7-year warranty. The switching method is as shown on the drawings.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Standards:
 - 1. ENERGY STAR certified.
 - 2. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
 - 3. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
 - 4. UL Listing: Listed for damp location.
 - 5. Recessed luminaires shall comply with NEMA LE 4.
- C. CRI of minimum 70. CCT of 3000 K or 4100 K, as indicated on drawings.
- D. Rated lamp life of 50,000 hours to L70.
- E. Dimmable from 100 percent to 0 percent of maximum light output.
- F. Internal driver.
- G. Nominal Operating Voltage: 120V to 277V, as indicated on drawings.
 - 1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- H. Housings:
 - 1. Extruded-aluminum housing and heat sink.
 - 2. Finish, as indicated on drawings.

2.2 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Diffusers and Globes:
 - 1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
 - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- D. Factory-Applied Labels: Comply with UL 1598. Locate labels where they will be readily visible to service personnel.

2.3 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Section 26 05 29- "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
- F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.
- B. Lighting Fixtures: Set level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Temporary Lighting: If it is necessary, and approved by Owner's Representative, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.
- D. Remote Mounting of Drivers: Distance between the driver and fixture shall not exceed that recommended by driver manufacturer. Verify, with driver manufacturers, maximum distance between driver and luminaire.
- E. Suspended Lighting Fixture Support
 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
 4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.
- F. Connect wiring according to Section 26 05 19 – "Low Voltage Electrical Conductors".
- G. Identification

1. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 26 05 53 – “Identification of Electrical Systems.”

3.2 FIELD QUALITY CONTROL

A. Start-Up Service

1. Burn-in all light fixtures that require specific aging period to operate properly, prior to occupancy by the Owner. Burn-in LED luminaires intended to be dimmed, for at least 100 hours at full voltage.

END OF SECTION 26 50 00

SECTION 26 90 00 - PROJECT CLOSE-OUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS

- A. The Electrical contractor shall keep a record copy of the bid set and fabrication drawings at the job site and shall accurately maintain a record with dimensions and elevations of all changes to the contract drawings as the job progresses. At the completion of the job, the electrical contractor shall obtain a sepia reproducible from the Architect and shall make changes which occurred during construction on drawings and submit three (3) copies to the Engineer. The Engineer will check drawings and will return them to contractor with comments or statement of approval, as applicable.

1.2 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS:

- A. After installation has been completed, equipment has been tested, systems placed in permanent operation, and all adjustments made, a competent start-up technician shall be provided for a period of two working days. This technician shall operate the systems during this time, and during this time shall instruct the Owner's designated representatives in the operation and maintenance of the equipment. The start-up technician shall be at the site continuously during working hours during the instructional period.

1.3 Operating and Maintenance Manuals:

- A. The form in which the operating maintenance manual is to be presented shall be subject to approval by the Architect.
- B. The following items, together with any other necessary and pertinent data, shall be included in the manual. This list is not necessarily complete and is only to be used as a guide.
- C. A check list for periodic maintenance of all equipment, with maintenance and cleaning instructions.
- D. Parts list for all replaceable service parts, and indicate where they may be purchased.
- E. Manufacturer's cuts and rating tables for all equipment, including copies of all factory record drawings and all other shop drawings.
- F. Test data on all equipment.
- G. Serial numbers of all principal pieces of equipment.
- H. Manufacturers', suppliers, and subcontractors' names, addresses, and telephone numbers.
- I. The first page shall identify project and give name, address and phone number of Architect, Engineer, Mechanical and Electrical sub-contractors and any service companies involved and give name and night phone of each party responsible for service.

1.4 WARRANTIES:

- A. Deliver to Owner all warranties, guarantees, etc. and obtain written receipts.

1.5 PUNCH LIST:

- A. During construction period the A/E will issue punch lists. These items shall be completed before A/E will approve next application for payment. Final punch list work shall be completed before acceptance.

1.6 FINAL INSPECTION AND ACCEPTANCE:

- A. The architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
- B. Submit a list of uncompleted items, if any, and advise when the items will be done.
- C. Complete all items on A/E's prefinal punch list.

1.7 FINAL CLEAN UP:

- A. During construction this contractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises and to remove all evidence of his work.
- B. The contractor shall resolve all questionable items to be corrected prior to an inspection by the Engineer. If items have not been corrected completely, and additional site visits are required for the Engineer to check for compliance, the contractor will be billed by the Owner at \$125.00 per hour plus travel expenses for Engineer's services.

1.8 GUARANTEE:

- A. The guarantee shall be as stated in the General Conditions, and the General Provisions of this section.

1.9 CLOSE-OUT CHECK LIST:

- A. Provide, perform and submit all the items included in the following close-out list.

Section	Item	Action
26 01 00	Certificate of Inspection by Code Authority	Submit
26 01 00	Certificate of Completion	Submit
26 01 00	Remove all debris and clean: . Light Fixtures . Lenses . Equipment Interiors . Electrical Rooms	Perform
26 01 00	Operation and Maintenance Manuals	Submit
26 01 00	Equipment Warranties: A list of warranty contacts (names, addresses and phone numbers) must be submitted for each electrical item.	Submit
26 01 00	Factory Record Drawings	Submit with dimensioned circuit runs.
26 50 00	Light Fixture Extra Lenses	Provide/Verify
26 50 00	Clean Light Fixtures, Lenses.	Perform

END OF SECTION 26 90 00