

PROJECT MANUAL

Building B Shop Fan Coil Units

**NUNEZ COMMUNITY COLLEGE
3710 PARIS ROAD
CHALMETTE, LA 70043**

BID NUMBER: 40015-HVAC-Coils

BID DUE DATE & TIME: March 5, 2024 at 3:00PM CST

**MANDATORY PRE-BID CONFERENCE: February 22, 10:00AM
Building B Room B-106**

**PURCHASING REPRESENTATIVE: Wendy Frazier
(504) 278-6475 E-Mail wfrazier@nunez.edu**

**FACILITIES REPRESENTATIVE: Randy Hartzog
(504) 278-6373 E-Mail rhartzog@nunez.edu**

**ENGINEER:
CRUMB ENGINEERING.COM
(504) 455-4450**

BID RELEASE DATE: February 12, 2024

ADVERTISEMENT FOR BIDS

Project: NUNEZ COMMUNITY COLLEGE
CHALMETTE, LA 70043
BUILDING B HVAC REPAIRS

Contract No./Nunez Project No: **40015-HVAC- Coils**

Sealed bids will be received by the Nunez Community College Property Department, located at 3710 Park Boulevard, Building C Chalmette, Louisiana 70043 until **3:00 PM. CST** on **March 5, 2024**. All bids which have been duly received will be publicly opened in the Purchasing Office and, except as provided in LSA-R.S. 37:2163, read aloud. Late bids will not be accepted.

Description of the proposed work:

- Provide new fan coil units in shop areas.

Pursuant to LSA-R.S. 37:2163; Licensed Contractors may secure Bidding Documents from the Purchasing Department of Nunez Community College upon depositing the sum of \$50.00 for each set of documents until 24 hours prior to the bid opening. Licensed contractor shall submit evidence of Louisiana State License and License number with the deposit. Check is to be made payable to Nunez Community College.

- A mandatory pre-bid conference will be held at the 3710 Paris Road, Chalmette, LA 70043 in Building B, Room B-106 on February 22, 2024, 10:00AM CST.

Type of Bid: Bids shall be on a lump sum basis. Segregated bids will not be accepted.

Bid Security on the amount of five percent (5%) of the total bid must accompany each Bid. A certified, cashier's check or a bid bond is acceptable bid security. If a bid bond is used, it shall be written by a surety or insurance company currently on the U.S Department of the Treasury Financial Management service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A.M. Best's Key rating Guide to write individual bonds up to ten percent of policyholders surplus as shown in the A.M. Best's Key Rating Guide (LSA-R.S. 38:2218.C)

Bidder shall certify that he is licensed under the provisions of LSA-R.S.37:2150 et seq. and show his license number on the bid envelope. Except as otherwise noted in LSA-R.S. 37:2163, any bid that does not contain the contractor's certification and show the contractor's license number on the bid envelope shall automatically be rejected, not read aloud and returned to the Bidder. Any Bidder who submits a bid for a type of construction for which he is not properly licensed shall be acting in violation of LSA-R.S. 37:2163 and shall be subject to all provisions for violations and penalties thereof. Any interested parties may object to the licensing classification of this public project in accordance with LSA-R.S. 37:2163. C

The successful Bidder will be required to furnish a Performance Bond guaranteeing faithful performance and a Payment Bond guaranteeing the payment of all bills and obligations arising from the performance of the contract.

Sureties will be required to meet qualifications set forth in LSA-R.S. 38:2218 and R.S. 38:2219 as applicable, and as set forth in the Contract Documents.

Nunez Community College reserves the right to reject any or all bids, to waive any and all informalities, and to reject nonconforming, non-responsive, or conditional bids whichever is in the best interest of Nunez Community College.

Publish: Advocate (Baton Rouge and New Orleans) February 12, 2024, February 19, 2024, and February 26, 2024.

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TECHNICAL SPECIFICATIONS**SECTION NUMBER****TITLE**

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013100	Project Management & Coordination
013300	Submittals
014000	Quality Requirements
016000	Project Requirements
017000	Execution Requirements
017700	Closeout
017810	Project Record Documents
017820	Operation & Maintenance Data
021000	Demolition
220700	Insulation
230500	General Mechanical
230593	Testing & Balancing
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233000	Mechanical Systems
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DRAWINGS**SHEET NUMBER****TITLE****Cover Sheet**

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ME1.0	Partial Floor Plan – Mechanical & Electrical
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INSTRUCTIONS

ARTICLE 1

PROJECT TITLE AND BID OPENING DATE & TIME

- 1.1 Project Title: **Building B Shop Fan Coil Units**
Bid Opening Date & Time: **March 5, 2024 at 3:00PM**

ARTICLE 2

BIDDERS REPRESENTATION

- 2.1 Each Bidder by making his Bid represents that:

- 2.1.1 He has read and understands the Bidding Documents and his Bid is made in accordance therewith.
- 2.1.2 He has visited the site and familiarized himself with the local conditions under which the work is to be performed.

The Bidder is advised to carefully consider all College physical features and activities and occupancies by faculty, staff and students and to plan construction activities so as not to disrupt the normal operations and activities of the College except as expressly permitted by the College in writing. The Bidder shall be especially aware of existing electric, gas, water, telephone and/or other utilities which may be in the way of or adjacent to the Work, and shall take appropriate action to protect these utilities during the Work.

Every effort has been made to accurately show all pertinent surface and subsurface features accurately. For self-assurance, the Bidder may examine available drawings and documents related to College premises. Such examinations may be made only in the offices of Facility Services as part of the Mandatory Pre-Bid Conference.

- 2.1.3 His Bid is based solely upon the materials, systems, and equipment described in the Bidding Documents, as advertised and as modified by Addenda.
- 2.1.4 When a discrepancy or ambiguity arises between the written specifications and the drawings, the document which is more stringent, or which benefits the College more as determined by the Director, shall govern.
- 2.1.5 His Bid is not based on any verbal instructions contrary to the Bidding Documents and Addenda.
- 2.2 The Bidder must be fully qualified under any State or local licensing law for Contractors in effect for the location of the work before submitting his Bid. The Contractor shall be responsible for determining that all of his/her Sub-bidders or prospective Subcontractors are duly licensed in accordance with the law. (See paragraph 4.1.8)

- 2.3 The College reserves the right to examine the successful Bidders past payroll records and those of any subcontractor to determine whether the employees being used on the contract are regularly employed. The College also reserves the right to question the use of an employee whom it feels is unskilled or untrained on a task that requires a skill. If the Bidder intends to use laborers or unskilled workman on any aspect of the Contract, the Bidder must furnish a list of tasks to be performed by said laborers and unskilled workmen with their Bid.
- 2.4 If the Contractor is required to replace any employees because of their failure to comply with these requirements, any time lost on the job shall be the responsibility of the Contractor and shall not be an acceptable reason for requesting and extensions of any completion deadlines or waiver of any liquidated damages specified elsewhere in the Bid Documents.
- 2.5 The College reserves the right to reject any and all bids at its discretion.

ARTICLE 3 BIDDING DOCUMENTS

3.1 Copies

- 3.1.1 Complete sets of Bid Documents may be obtained from Nunez's Purchasing Department

The Bidding Documents consist of the Instruction to Bidders, Forms, Technical Specifications and Drawings. Changes to the work made after the contract signing shall be documented by a Change Order.

These INSTRUCTIONS TO BIDDERS, including amendments and additions thereto apply to each and every heading of the TECHNICAL SPECIFICATIONS with the same force as though repeated in full under each heading.

- 3.1.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither the College nor its Consultant(s) assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 3.1.3 The College or Consultant in making copies of the Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the work and do not confer a license or grant for any other use.

3.2 Interpretation or Correction of Bidding Documents

- 3.2.1 Interpretation, correction or change of the Bidding Documents will be made by Addenda. Interpretations, corrections or changes of the Bidding documents made in any other manner will not be binding, and Contractor shall not rely upon such interpretations, corrections and changes.
- 3.2.2 It shall be the Contractor's responsibility to make inquiry as to Addenda issued. All issued

Addenda must be acknowledged on the Bid Form and shall become part of the Contract. Neither the College nor its Consultant(s) will be responsible for any explanation or interpretations of the Bidding Documents not covered by written, issued Addenda.

- 3.2.3 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the College's Purchasing Representative at least seven (7) days prior to the date for receipt of Bids.

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. No substitutions shall be allowed without approval.

3.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the College Representative at least (7) seven days prior to the due date and time for receipt of bids.

Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute, including model numbers, drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included.

3.3.3 If the College approves any proposed substitution, such approval will be set forth in an addendum. Bidder shall not rely upon approvals made in any other manner.

3.4 Addenda

3.4.1 Addenda will be emailed or faxed to all Contractors in attendance at the mandatory Pre-Bid Conference or to all Bidders if No mandatory Pre-Bid Conference is scheduled.

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

3.4.3 Addend shall not be issued within a period of seventy-two (72) hours prior to the due date and time set for the opening of Bids, excluding Saturdays, Sundays, and any other legal holidays. However, if the necessity arises to issue an Addendum modifying plans and specifications within the seventy-two (72) hour period prior to the time for the opening of Bids, then the opening of Bids shall be extended by exactly one (1) week, without the requirement of re-advertising.

3.4.4 The College shall have the right to extend the Bid date by up to thirty (30) days without the requirement of re-advertising. Any such extension shall be made by Addenda issued by the Purchasing Office.

3.4.5 Each Bidder shall ascertain from Delgado's Purchasing Office prior to submitting his Bid that he has received all Addenda issued. Receipt must be acknowledged on the Bid Form where noted.

3.5 Ownership

All records, reports, documents and other materials delivered or transmitted to Contractor by Nunez Community College shall remain the property of Nunez Community College, and shall be returned by the Contractor to the College, at the Contractor's expense, at the termination or expiration of the Contract. All records, reports documents, or other material related to this contract and/or obtained or prepared by the Contractor in connection with the performance of the services contracted for herein shall become the property of DCC, and shall, upon request, be returned by Contractor to DCC, at Contractor's expense at termination of this Contract.

3.6 Non-assignability

No Contractor shall assign any interest on this contract by assignment, transfer, or novation, without prior written consent of Nunez Community College. This provision shall not be construed to prohibit the contractor for assigning his bank, trust company, or other financial institution any money due or to become due from approved contracts without such prior written consent. Notice of any such assignment or transfer shall be furnished promptly to Nunez.

ARTICLE 4 BID PROCEDURE

4.1 Form and Style of Bids

4.1.1 Bids must be submitted on the forms provided by the College.

4.1.2 All blanks on the Bid Form shall be filled in by either electronic means, typewriter or manually in ink. Signature in mandatory in ink.

4.1.3 Where indicated on the Bid Form, sums must be expressed in both words and figures, and in the case of discrepancy between the two, the written words shall govern.

4.1.4 Any interlineations, alteration, or erasure must be initialed by the signer of the Bid or his authorized representative.

4.1.5 Bidders are cautioned to complete all alternates should such be required on the Bid Form. Failure to submit alternate prices will render the proposal informal and shall cause its rejection.

4.1.6 Bidder shall make no additional stipulations on the Bid Form nor qualify his Bid in any other manner.

4.1.7 The Bid shall include the legal name of the Bidder and the Bid must be signed by the person or

persons legally authorized to bind the Bidder to a Contract. A Bid submitted by and agency shall have a current Power of Attorney attached certifying agent's authority to bind the Bidder. The name and license number on the outside of the envelope shall be the same as on the Bid Form.

In accordance with R.S. 38:2212(A) (1) (c), the person signing the Bid must be: 1) A current corporate officer, partnership member or other individual specifically authorized to submit bids as evidenced in appropriate records on file with the Secretary of State; or 2) An individual authorized to bind the vendor, and Bid is accompanied by a corporate resolution, certification as to the corporate principal, or other documents indicating authority which are acceptable to the College.

By signing this Bid, the Bidder certifies compliance with the above.

- 4.1.8 On any Bid of Fifty Thousand Dollars (\$50,000) or more, the Contractor shall certify that he is licensed under R.S. 37:2150-2173 by placing his signature on the appropriate blank on the Bid Form.

The Contractor shall place his Louisiana Contractor License Number on the appropriate blank on the Bid Form

The Contractor shall be licensed by the Louisiana State Licensing Board for Contractors under Category 1, Building Construction

Bids in excess of Fifty Thousand Dollars (\$50,000) received from Contractor's not licensed under the above classification will not be considered.

4.2 Bid Security

- 4.2.1 Bid Security must accompany the Bid in the sealed envelope. Bidder is to attach a certified check, cashier's check, or the Nunez Community College Bid Bond Form in the amount of 5% of the sum of the base Bid and all alternates, as evidence of good faith. Bidders are hereby notified that Bank Checks, Official Bank Checks or similar are not acceptable as bid security. Certified or cashier's checks are to be drawn in favor of Nunez Community College.
- 4.2.2 The bid bond shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent of policyholder's surplus as shown in A.M. Best's Key Rating Guide (LSA-R.S. 38:2218.C). If the bid security is a Bond, then such Bond shall be submitted on the Bid Bond Form included in the specifications. Any Bond submitted other than on this Bond Form shall cause the Bid to be rejected.
- 4.2.3 Bid Security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish Performance and Payment Bonds as required by these Bidding Documents.

4.3 Submission of Bids

- 4.3.1 Bids must be sealed in an envelope with the project title clearly indicated on the outside of the envelope and will be received until the time and place specified in these Bidding Documents. It shall be the specific responsibility of the Bidder to deliver his Bid to the College's Purchasing Office prior to the announced time. Late Bids not accepted.

If the Bid is sent by mail or express delivery, the sealed envelope shall be addressed to: Nunez Community College, Purchasing Department, 3710 Paris Road, Building B Room B-106, Chalmette, LA 70043 and shall bear the name and number of the project on the outside of the express mail packaging.

- 4.3.2 Bids are to be delivered to the designated location prior to the time on the date for receipts of Bids indicated in these Bid Documents, or any extension thereof made by Addendum.
- 4.3.3 Bidder shall assume full responsibility for timely delivery at location designated for receipt of Bids.
- 4.3.4 Oral, telephonic, telegraphic or faxed Bids are invalid and shall not receive consideration.
- 4.3.5 The College will not consider notations written on the outside of the Bid envelope which have the effect of amending the Bid. Written modifications enclosed in the bid envelope, and signed or initialed by the Bidder or his representative, shall be accepted.

4.4 Modification or Withdrawal of Bid

- 4.4.1 A Bid may not be modified, withdrawn, or canceled by the Bidder for a period of thirty (30) calendar days for the period following the time and bid date designated for the receipt of Bids, and the Bidder so agrees in submitting his Bid, except in accordance with R.S. 38:2214 which states, in part, "Bids containing patently obvious, unintentional, and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quality of work, labor, material, or services made directly in compilation of the Bid, may be withdrawn by the Bidder if clear and convincing sworn, written evidence of such error is furnished to the College's Purchasing Department within forty-eight (48) hours of the Bid opening excluding Saturdays, Sundays, and legal holidays. Such errors must be clearly shown by objective evidence drawn from inspection of the original work papers, documents, or materials used in the preparation of the Bid sought to be withdrawn. If the College Purchasing Department determines that the request is qualified per the conditions listed, it shall accept the withdrawal and return the Bid Security to the Bidder.
- 4.4.2 Prior to the time and date designated for the receipt of Bids, Bids submitted early may be modified or withdrawn by written notice to the College Purchasing Department at the place and prior to the time designated for receipt of Bids.
- 4.4.3 Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these instructions.
- 4.4.4 Bid Security shall be in an amount sufficient for the Bid as modified and resubmitted.

ARTICLE 5
CONSIDERATION OF BIDS

5.1 Opening of Bids

The properly identified Bids received on time will be opened publicly, will be read out loud, and a tabulation abstract of the amounts of the base bids and alternates, if any, will be made available to Bidders.

5.2 Rejection of Bids

The College shall have the right to reject any or all Bids at their discretion and in particular to reject a Bid not accompanied by any required bid security of data required by the Bidding Documents, or a Bid in any way irregular or incomplete. The provisions and requirements of the Instructions to Bidders, the Advertisement for Bids, and those required on the Bid Form shall not be considered as informalities and shall not be waived.

5.3 Acceptance of Bid

5.3.1 It is the intent of the College, if any alternates are accepted, to accept them in the order in which they are listed on the Bid Form. Determination of the low Bidder shall be on the basis of the sum of the base Bid and the alternates accepted. However, the College shall reserve the right to accept alternates in any order which does not affect determination of the low Bidder.

5.3.2 Nunez Community College, upon receipt of Bids, shall act within thirty (30) calendar days of such receipt to award the contract to the lowest responsible Bidder or reject all Bids. However, the College, by mutually written consent, may agree to extend the deadline of award by one or more extensions of thirty (30) calendar days.

ARTICLE 6
PERFORMANCE AND PAYMENT BOND

6.1 Bond Required

The Bidder shall pay for and provide a Performance shall be written by a & Labor and Material Payment Bond in the full amount of the Bid within ten (1) days after written notice from the College or its Consultant that the work has been awarded to him. The Bond furnished shall be a statutory bond and no modification, omissions, additions in or to the terms of the Contract, in the plans, specifications or in the manner and mode of payment shall in any manner diminish, enlarge or otherwise modify the obligations of the bond. The Surety Bond shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service List of approved bonding companies which is published annually in the Federal Register or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds. No surety or insurance company shall write a bond which is to investigate, handle, respond to, provide defense for and in excess of the amount indicated as approved by the U.S. Department of the Treasury Financial Management Service List. Companies authorized by this paragraph who are not on the Treasury List shall not write a

bond when the penalty exceeds fifteen percent (15%) of its capital and surplus, such capital and surplus being the amount by which the company's assets exceed its liabilities as reflected by the most recent financial statements filed by the company with the Department of Insurance. In addition, any surety bond written for a public works project shall be written by a surety or insurance company that is currently licensed to do business in the State of Louisiana. Bond shall be in favor of the College.

6.2 Time of Delivery and Form of Bond

6.2.1 The Bidder shall deliver the required bond to the College simultaneous with the execution of the Contract.

6.2.2 Bond shall be in the form furnished by Nunez Community College entitled "PERFORMANCE AND PAYMENT BOND, a copy of which is included in the Bidding Documents.

6.2.3 The Bidder shall require the Attorney-in-Fact who executes the bond on behalf of the surety to affix thereto a certified and current copy of his Power of Attorney.

ARTICLE 7

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

7.1 Form to be used

7.1.1 The form of the Contract to be used shall be furnished by the College's Purchasing Department, a copy of which is bound in the Bidding Documents.

7.1.2 In accordance with Louisiana Law, when the Contract is awarded, the successful Bidder shall, at the time of the signing of the Contract execute the Non-Collusion Affidavit and Attestation Clause included in the Contract Documents.

As soon as the Contract has been fully awarded according to law, certified checks will be returned upon request to all Bidders, other than the successful Bidder; the latter's check will be returned upon the signing of the Contract.

Upon the execution of the Contract, Nunez Community College, within thirty (30) days thereafter shall issue to the Contractor, a notice to proceed with the project. However, upon mutual consent by both parties, the notice to proceed may be extended.

7.1.3 After the purchase order has been issued, no changes will be made to any part without written approval for the Director of the Department issuing these Bid Documents. Any proposed change will be submitted in writing with a complete breakdown of all materials, labor and the individual cost of each.

7.2 Successful Bidder's Delivery Schedule

- 7.2.1 The successful Bidder will provide a delivery construction schedule to be submitted within fifteen (15) days after the date established for the Commencement of Work.
- 7.2.2 Schedule Updating: Contractor is to revise the schedule after each meeting, event, or activity where schedule revisions have been recognized or made. Contractor is to distribute the updated schedule within seventy-two (72) hours to the College Representative for review.

7.3 Discriminatory Practices

Both the College and the Contractor shall abide by the requirements of Title VII of the Civil Rights Act of 1964, and shall not discriminate against employees or applicants due to race, color, religion, sex, handicap or national origin. Furthermore, both parties shall take affirmative action to provide for positive posture in employing and upgrading persons without regard to race, color, religion, sex, handicap, or national origin and shall take affirmative actions as provided by the Vocational Rehabilitation Act of 1974 to ensure that services are delivered without discrimination due to race, color, sex, handicap or national origin. Both parties shall comply with the requirements of the Americans with Disabilities Act of 1990 which bans discrimination in employment or in delivery of services on the basis of sexual orientation.

7.4 Affirmative Action/Non-Discrimination

If the amount of the contract exceeds \$10,000, the successful Bidder shall be required to execute the Equal Employment Opportunity Clause and Assurance of non-discrimination prior to the College entering into a Contract. These documents will be in accordance with Chapter 60 of the rules and regulations, Office of Federal Contract Compliance, Equal Opportunity, U.S Department of Labor.

7.5 Recording Contract

- 7.5.1 The Contractor, at his own expense, should record the original executed Contract with the Recorder of Mortgages, Orleans Parish, within five (5) working days of the Contract signing. A NOTICE OF THIS RECORDING MUST BE SENT TO THE PURCHASING OFFICE BEFORE THE PURCHASE ORDER WILL BE ISSUED.
- 7.5.2 Recordation of Certain Change Orders, see General Conditions, 1.16 CHANGES TO THE WORK

7.6 Payments

- 7.6.1 The Contract shall provide payment equal to not more than ninety percent (90%) of the total contract amount upon completion of the work. The remaining ten percent (10%) shall be paid within forty-five (45) days after the acceptance of the work by the College provided that a clear lien certificate is provided by the Contractor.
- 7.6.2 College standard forms for "Schedule of Values" and "Payment Request" will be provided to the Contractor at the Pre-Construction Conference. An original invoice must accompany the Delgado Community College pay request forms. ONLY PAYMENT REQUESTS SUBMITTED ON THE

COLLEG FORM WILL BE PROCESSED FOR PAYMENT. ALL OTHERS WILL BE RETURNED FOR COMPLIANCE WITH THIS REQUIREMENT.

- 7.6.3 When an engineer, designer, or architect is involved with the project, all pay requests must have his or her original signature on the original pay request form **before** they are submitted to the College for processing.
- 7.6.4 No notice of completion, delivery memo, invoice, or other document will be signed, or approvals of any type given for any part of the job or delivery of any equipment or materials, except by the College's Project Manager, Director of Facilities or his or her designee, such designee to be made in writing and signed by the Director.
- 7.6.5 All work to be done during normal working hours unless the Director of Facilities grants prior written approval, or the scope of work requires that the work be done after hours.

7.7 Termination of Contract for Convenience

- 7.7.1 The Owner may, at any time, terminate the Contract for the College's convenience and without cause. Upon receipt of written notice from the College of such termination for the College's convenience, the Contractor shall; cease operations as directed by the College's notice; take actions necessary, or that the College may direct, for the protection and preservation of the materials, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and subsequent purchase orders.
- 7.7.2 In case of such termination, the Contractor shall be entitled to receive payment for work executed along with reasonable overhead and profit.
- 7.7.3 The College shall not be responsible or otherwise liable for any demobilization costs or incidental or consequential damages resulting from such termination.

7.8 Acceptance of Work

Upon substantial completion of the Work, the College shall execute a certificate that the whole work provided for in this Agreement has been completed and approved under the terms and conditions thereof. The Contractor shall then file the acceptance of the whole work, at his expense, with the Recorder of Mortgage in the Parish of St. Bernard.

ARTICLE 8
COMPLETION TIME AND LIQUIDATED DAMAGES

8.1 Contract Time

June 30, 2024 Substantial Completion date.

8.2 Liquidated Damages

Time is of the essence and completion of the work must be within the Contract Time for Completion stated in section 8.1, subject to such extensions as may be granted by the College for delays identified as beyond the Contractor's control.

The Contractor will be assessed three-hundred dollars (\$300) per day for each calendar day during which the work remains incomplete following the time specified for substantial completion, not as a penalty, but as acknowledged liquidated damages.

ARTICLE 9
PRE-BID CONFERENCE/JOBSITE VISIT

- 9.1 A mandatory Pre-Bid Conference shall be held at the project site. Provisions of the of this conference are included and must be attended by any Bidder wishing to submit a Bid for the work specified. This conference will be held on **February 22, 2024 at 10:00AM CST in Building B, Room B-106 3710 located at 3710 Paris Road, Chalmette, LA 70043.**

The purpose of this pre-bid conference is to familiarize Bidders with the requirements of the Project, the intent of the Bidding Documents and to receive comments and information from interested parties.

- 9.2 Any revision of the Bidding Documents made as a result of the Pre-Bid Conference and Site Visit shall not be valid unless included in an Addenda issued in accordance with Section 3.4, Instructions to Bidders.

ARTICLE 10
INSURANCE

- 10.1 The Contractor, prior to commencing work, shall provide at his expense, proof of insurance coverage with insurance companies licensed in the State of Louisiana. Insurance shall be placed with insurers with an A.M Best's rating of no less than A-:VI.

Insurance requirement are set forth in "Supplement I" of these documents.

SUPPLEMENT I

INSURANCE REQUIREMENTS FOR NEW CONSTRUCTION AND RENOVATIONS

Standardized Insurance Requirements for all Agency Contracts

The following Indemnification Agreement shall be, and is hereby, a provision of the Contract:

- I. The other party agrees to protect, defend, indemnify, save and hold harmless the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants, and employees, including volunteers, from any and against any and all claims, demands, expense and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur or in any way grow out of any act or omission of the other party, its agents, servants, and employees, or any and all costs, expense, and/or attorney fees incurred by the other party as a result of any claim, demands, and/or causes of action except of those claims, demands, and/or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its agents, representatives, and/or employees. The other party agrees to investigate, handle, respond to, provide defense for and defend any such claims, demand, or suit at its sole expense and agrees to bear all other costs and expenses related thereto, even if it (claims, etc.) is groundless, false or fraudulent.

- II. All policies and certificates of insurance of the Contractor/Subcontractor shall contain the following clauses:
 - A. The Contractor/Subcontractor's insurer will have no right of recovery or subrogation against the Agency, it being the intention of the parties that the insurance policies so affected shall protect both parties and the primary coverage for any and all losses covered by the below described insurance.

 - B. The Agency shall be named as an additional insured as regards to negligence by the Contractor/Subcontractor (SSO Form CG 20 10 – current form approved for use in Louisiana)

 - C. The insurance company issuing the policy or policies shall have no recourse against the Agency for payment of any premiums or for assessments under any form of policy.

 - D. Any and all deductibles in the below described insurance policies shall be assumed by and be for the amount of, and at the sole risk of the Contractor/Subcontractor.

- III. INSURANCE: The Contractor/Subcontractor, prior to the commencement of work, shall provide at his own expense, proof of the following insurance coverages required by the Contract to the Agency by an insurance company(s) authorized in the State of Louisiana. Insurance is to be placed with insurers with an A.M. Best's rating at A-:VI or higher. This rating requirement may be waived on Workman's Compensation coverage only.

Thirty days prior notice of cancellation shall be given to the Agency by registered mail, return receipt requested, on all of the required coverage provided to the Agency. All notices will name the Contractor/Subcontractor and identify the Contract number.

Insurance coverage specified in the GENERAL CONDITIONS (AIA Document A 201, 1997 Edition) to be provided by the Contractor, and any other insurance described below shall be furnished with the

following minimum limits:

- A. Worker's Compensation Statutory in compliance with Compensation Law of Louisiana. Exception: Employers liability to be \$1,00000 when work is over water and involves maritime exposures.
- B. Commercial General Liability Insurance with a combined single limit per occurrence for bodily injury and property damage and must also include the following coverages:
 - a. Premises Operations;
 - b. Broad Form Contractual Liability
 - c. Products and Completed Operations;
 - d. Use of Contractors and Subcontractors
 - e. Personal Injury
 - f. Broad Form Property Damage
 - g. Explosion, Collapse and Underground (XCU) Coverage

NOTE: On the Certificate of Insurance, under the description of operations, the following wording is required: THE AGGREGATE LOSS LIMIT APPLIES TO EACH PROJECT, or a copy of ISO form CG 25-03 (current form approved for use in Louisiana) shall be submitted.

COMBINED SINGLE LIMIT (CSL) AMOUNT OF INSURANCE REQUIRED

Type of <u>Construction</u>	Projects under <u>\$100,000</u>	Projects \$100,001 <u>up to \$1,000,000</u>	Projects over <u>\$1,000,000</u>
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New Buildings:

Each Occurrence/

Minimum Limit	\$500,000	\$1,000,000	\$3,000,000
Aggregate (Applicable to This project only)	\$500,000	\$1,000,000	\$3,000,000

Renovations:

Each Occurrence/

Minimum Limit	\$500,000**	\$1,000,000**	\$3,000,000**
Aggregate	\$500,000**	\$1,000,000**	\$3,000,000**

The Buildings Value for this Project is: _____

While the minimum combined single limit of \$500,000 is required for all renovations, the value of a building shall be multiplied by 10% and the insurance requirements will be increased at \$1,000,000 intervals and rounded to the nearest \$1,000,000. Example: Renovation on a \$33,000,000 building would require \$3,000,000 minimum combined single limit of coverage. Maximum limit required is \$5,000,000 regardless of building value.

- C. Business Automobile Liability Insurance with a combined single limit of \$1,000,000 per occurrence for bodily injury and property damage, unless otherwise indicated. This insurance shall include for bodily injury and property damage, unless otherwise indicated and shall include for bodily injury and property damage the following coverages:
 - a. Owned Automobiles
 - b. Hired Automobiles
 - c. Non-owned automobiles
- D. An Umbrella Policy may be used to meet minimum requirements.

IV. All Property losses shall be made payable to and adjusted with the Agency.

V. All policies of insurance shall be approved by the contracting Agency prior to the inception of any work.

VI. Other insurance required as follows:

Owners Protective Liability (OPL) Insurance shall be furnished by the Contractor and naming the State of Louisiana & Delgado Community College as the Named Insured for Projects over \$50,000.

	Projects under \$100,000	Projects \$100,001 up to \$1,000,000	Projects over \$1,000,000
CSL Each Occurrence:	\$500,000	\$1,000,000	\$3,000,000

VII. Property Insurance

The General Contractor shall purchase and maintain property insurance upon the entire work included in the Contract for an amount equal to the greater of the full-completed value or the policy shall provide "ALL RISK" Builder's Risk Insurance (extended to include the perils of wind, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure). The "All Risk" Builder's Risk Insurance must also cover architect's and engineer's fees that may be necessary to provide plans, specifications and supervision of the work for the repair and/or replacement of property damage caused by a covered peril not to exceed 10% of the cost of those repairs and/or replacements.

Flood coverage shall be provided by the Contractor on the first floor and below for projects North of the Interstate Corridor beginning at the Texas-Louisiana border at Interstate 10 east to the Baton Rouge junction of Interstate 12, east to Slidell junction with Interstate 10 to the Mississippi border. Flood sub-limit shall equal an amount no lower than 10% of the total contract cost per occurrence. Coverage for roofing projects shall not require coverage.

On projects South of this corridor, flood coverage shall be provided by the State of Louisiana, as the owner, through the National Flood Insurance Program (NFIP). The Contractor will be liable for the \$5,000 deductible on the NFIP policy from the Notice to Proceed date through the Notice of Final Acceptance date of the Project.

A specialty Contractor shall purchase and maintain property insurance upon the system to be installed for an amount equal to the greater of the full-completed value or the amount of the contract including any amendments thereto. The specialty contractor may provide and installation floater with the same coverage as the "ALL RISK" Builders Risk Insurance policy.

The policy must include the interest of the Owner, Contractor, and Subcontractors as their interest may appear. The contractor has the right to purchase coverage or self-insure any exposures not required by the Bid Specifications, but shall be held liable for all losses, deductibles, of additional or self-insurance for coverage not required.

Policies insuring projects involving additions, alterations, or repairs to existing buildings or structures must include and endorsement providing the following:

In the event of disagreement regarding a loss covered by this policy which may also be covered by the State of Louisiana, Policy of self-insurance or any commercial property insurance policy purchased by the State of Louisiana, Office of Risk Management (ORM) covering in excess of the State of Louisiana, policy of self-insurance, this company agrees to the following procedure to establish coverage and/or the amount of loss:

Any party to a loss may make a written demand for an appraisal of the matter in disagreement. Within 20 days of receipt of written demand, this company and either ORM or its commercial insurance company, shall each select a competent and impartial appraiser and notify the other of the appraiser selected. The two appraisers will select a competent and impartial umpire. The appraiser will then identify the policy or policies under which loss is insured and, if necessary, state separately the value of the property and the amount of loss that must be borne by each policy. If the appraisers fail to agree, they shall submit their differences to the umpire. A written decision by any two shall determine the policy or policies and the amount of loss. Each insurance company (or ORM) agree that the decision of the appraisers and the umpire. If involved, will be binding and final and that neither party will resort to litigation. Each of the two parties shall pay its chosen appraiser and bear the cost of the umpire equally.

- VIII. If at any time, any of the said policies shall be or become unsatisfactory to the Agency, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Agency, the Contractor/Subcontractor shall promptly obtain a new policy, submit the same to the Agency for approval and submit a certificate thereof as herein above provided.

Upon failure of the Contractor/Subcontractor to furnish; deliver and maintain such insurance as above provided, this Contract, at the election of the Agency; may forthwith declared suspended, discontinued or terminated. Failure of the Contractor/Subcontractor to take out and/or maintain or the taking out and/or maintenance of any required insurance shall not relieve the Contractor/Subcontractor from any liability under the Contract, not shall the insurance requirements be construed to conflict with any obligations of the Contractor/Subcontractor concerning indemnification. The Agency reserves the right to require complete, certified copies of all required insurance policies.

INFORMATION FOR BIDDERS

RIKS AND INDEMNIFICATIONS ASSUMED BY THE CONTRACTOR

- A. Neither the acceptance of the completed work or payment therefore shall release the Contractor/Subcontractor from his obligations from the insurance requirements or indemnifications agreement.
1. Additional insurance may be required on an individual basis for extra hazardous contracts and specific service agreements. If such additional insurance is required for a specific contract, the requirements will be described in the "Special Conditions" of the contract specifications.
 2. If any of the Property and Casualty insurance requirements are not complied with at their renewal dates, payments to the Contractor/Subcontractor will be withheld until those requirements have been met, or at the option of the Agency, the Agency may pay the renewal premium and withhold such payments from any monies due the Contractor/Subcontractor.
 3. All property losses shall be made payable to and adjusted with the Agency.
 4. All policies and certificates of insurance shall be approved by the contracting Agency prior to the inception of any work.
 5. Other coverages may be required by the Agency based upon specific needs. If such other coverages are required by this contract, those coverages will be described in the "Special Conditions" of the contract specifications.
 6. If at any time any of the foregoing policies shall be or become unsatisfactory to the Agency, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Agency, the Contractor/Subcontractor shall upon notice to that effect from the Agency, promptly obtain a new policy, submit the same to the Agency for approval and submit a certificate thereof as herein above as provided. Upon failure of the Contractor/Subcontractor to furnish, deliver and maintain such insurance as above provided, this Contract, at the election of the Agency, may be forthwith declared suspended, discontinued, or terminated. Failure of the Contractor/Subcontractor to take out and/or maintain or the taking out and/or maintenance of any required insurance shall not relieve the Contractor/Subcontractor from liability under the Contract, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor/Subcontractor concerning indemnification. The Agency reserves the right to require complete, certified copies of all required insurance policies at any time.

SUBCONTRACTORS

Contractor shall include all subcontractors as insured under its policies or shall furnish separate certificates for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

CERTIFICATES OF INSURANCE

Contractor shall furnish the Agency with certificates of insurance affecting coverage required by this clause. The certificates for each insurance policy are to be signed by the person authorized by that insurer to bind coverage on its behalf. The certificates are to be received and approved by the Agency before work commences. The Agency reserves the right to require complete, certified copies of all required insurance policies at any time.

INSURANCE REQUIREMENTS FOR CONTRACTORS

Contractor shall procure and maintain for the duration of the contract, insurance against claims for injuries or persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's cost.

A. MINIMUM SCOPE OF INSURANCE

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage "occurrence" form CG 00 01 (current form approved for use in Louisiana). "Claims Made" form is unacceptable.
2. Insurance Services Office form number CA 00 01 (current form approved for use in Louisiana) covering Automobile Liability. The policy shall provide coverage for owned, hired and non-owned vehicles. If an automobile is to be utilized in the execution of this Contract, and the Vendor/Contractor does not own a vehicle, then proof of hired and non-owned coverage is sufficient.
3. Workers' Compensation Insurance as required by the Labor code of the State of Louisiana, including Employers Liability Insurance.

B. MINIMUM LIMITS OF INSURANCE

Contractor shall maintain limits no less than:

1. Commercial General Liability Insurance, including Personal and Advertising injury Liability, shall have a minimum limit per occurrence of \$1,000,000 and a minimum general aggregate of \$2,000,000. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form approved for use in Louisiana) or equivalent, is to be used in the policy. Claims made form is unacceptable.
2. Automobile Liability: \$1,000,000 combined single limit per accident, for bodily injury and property damage. ISO form number CA 00 01 (current form approved for use in Louisiana) or equivalent is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.
3. Workers Compensation and Employers Liability: Workers Compensation limits as required by the Labor Code of the State of Louisiana and Employers Liability coverage. Exception: Employers liability limit is to be \$1,000,000 when work is to be over water and involves maritime exposure.

C. DEDUCTIBLES AND SELF-INSURED RETENTIONS

Any deductibles or self-insured retentions must be declared to and approved by the Agency. At the option of the Agency, either (1) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects to the Agency, its officers, officials, employees and volunteers, or (2) the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

D. OTHER INSURANCE PROVISIONS

The policies are to contain, or to be endorsed to contain the following provisions:

1. General Liability and Automobile Liability Coverage

- a. The Agency, its officers, officials, employees, Boards and Commissions and volunteers are to be added as “additional insured” as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Agency, its officers, officials, employees, Boards and Commissions or volunteers. It is understood that the business auto policy under “Who is an Insured” automatically provides coverage in favor of the State of Louisiana.
- b. Any failure to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, officials, employees, Boards and Commissions, and volunteers.
- c. The Contractor’s Insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer’s liability.

2. Worker’s Compensation and Employers Liability Coverage

The insurer shall agree to waive all rights of subrogation against the Agency, its officers, officials, employees, Boards and Commissions, and volunteers for losses arising from work performed by the Contractor for the Agency.

3. All Coverage’s

- a. Coverage shall not be cancelled, suspended, or violated by either party (Contractor/Vendor, or the insurer) or reduced in coverage or in limits except after (30) days written notice has been given to the Agency. (10) day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractors/Vendors policy.
- b. Neither the acceptance of the completed work nor the payment thereof shall release the Contractor/Vendor from the obligations or requirements, or indemnification agreement.
- c. The insurance companies issuing the policies shall have no recourse against the Agency for payment of premiums or for assessments under any form of the policies.
- d. Any failure of the Contractor/Vendor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, officials, employees, Boards and Commissions and volunteers.

E. ACCEPTABILITY OF INSURERS

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with an **A.M. Best’s rating of A-: VII or higher**. This rating requirement may be waived for worker’s compensations insurance only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor/Vendor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another Certificate of Insurance as required in the contract.

F. VERIFICATION OF COVERAGE

Contractor/Vendor shall furnish the Agency with Certificates of Insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that

insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Agency before work commences and upon any contract renewal thereof.

In addition to Certificates, Contractor/Vendor shall submit the declarations page and cancellation provision endorsement for each insurance policy. The Agency reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor/Vendor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Agency, may be suspended, discontinued or terminated. Failure of the Contractor/Vendor to purchase and/or maintain any required insurance shall not relieve the Contractor/Vendor from any liability or indemnification under the contract.

G. SUBCONTRACTORS

Contractor/Vendor shall include all subcontractors as insured under its policies OR shall be responsible for verifying and maintaining the Certificates provided by each Subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The Agency reserves the right to request copies of Subcontractors certificates at any time.

H. WORKERS COMPENSATION INDEMNITY

In the event the Contractor/Vendor is not required to provide or elects not to provide Workers Compensation coverage, the parties hereby agree that Contractor/Vendor, its owners, agents and employees will have no cause of action against, and it will not assert a claim against the State of Louisiana, its departments, agencies, agents, and employer, whether pursuant to the Louisiana Workers Compensation Act, or otherwise under any circumstances. The parties also hereby agree that the State of Louisiana, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of the Contractor/Vendor, its owners, agents and employees. The parties further agree that the Contractor/Vendor is a wholly independent contractor and is exclusively responsible for its employees, owners and agents. Contractor/Vendor hereby agrees to protect, defend, indemnify and hold the State of Louisiana, its departments, agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

I. INDEMNIFICATION HOLD HARMLESS AGREEMENT

Contractor/Vendor agrees to protect, defend, indemnify, save and hold harmless, the State of Louisiana, All State Departments, Agencies, Boards and Commissions, its Officers, Agents, Servants, Employees, and Volunteers, from and against any and all claims, damages, expenses, and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of the Contractor/Vendor, its agents, servants, and employees, or any and all costs, expenses and/or attorney fees incurred by the Contractor/Vendor as a result of any claims, demands, suits or causes of action, except those claims, demands, suits, or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its Officers, Agents, Servants, Employees and Volunteers.

EXHIBIT A
INDEMNIFICATION AGREEMENT

The _____ agrees to protect, defend, indemnify, save, and hold harmless the
{Contractor/Subcontractor/Lessee/Supplier}

State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants and employees, including volunteers, from and against any and all claims, demands, expenses and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur or in any way grow out of any act or omission of _____, its agents, servants, and
{Contractor/Subcontractor/Lessee/Supplier}

employees, or any and all costs, expenses and/or attorney fees incurred by

_____ as a result of any claims, demands, and/or causes of action except
{Contractor/Subcontractor/Lessee/Supplier}

those claims, demands, and/or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its agents, representatives, and/or employees.

_____ agrees to investigate, handle, respond to, provide defense for and
{Contractor/Subcontractor/Lessee/Supplier}

defend any such claims, demands, or suits at its sole expense and agrees to bear all other costs and expenses related thereto, even if they (claims, etc.) are groundless, false or fraudulent.

Accepted by _____
Company Name

Signature

Title

Date Accepted _____

Is Certificate of Insurance Attached? _____ Yes _____ No

Contract No. _____ for _____
State Agency Number and Name

PURPOSE OF CONTRACT: _____

EXHIBIT B

STATE OF LOUISIANA

PARISH/COUNTY OF _____

**NON-COLLUSION AFFIDAVIT ATTESTING THAT PUBLIC CONTRACT
WAS NOT, NOR WILL NOT BE SECURED
THROUGH EMPLOYMENT OR PAYMENT OF SOLICITOR**

KNOW ALL MEN BY THESE PRESENT that a public contract is contemplated between Delgado
Community College and _____,

represented by: (print or type) _____ attests that he is empowered and
authorized to execute said documents.

FURTHER, (signature) _____, who being duly sworn, does depose and attest
that:

1) Affiant employed no person, corporation, firm, association, or other organization, either directly or
indirectly, to secure the public contract under which he received payment, other than persons regularly
employed by the affiant whose services in connection with the construction, alteration or demolition of the
public building or project or in securing the public contract wherein the regular course of their duties for
affiant;

2) and, That no part of the contract price received by affiant was paid or will be paid to any person,
corporation, firm, association, or other organization for soliciting the contract, other than the payment of
their normal compensation to persons regularly employed by the affiant whose services in connection
with the construction, alteration or demolition of the public building or project were in the regular course of
their duties for affiant.

BEFORE ME, the representing authority, personally appeared, who being duly sworn, deposes and
states that the above is true and correct in all respects recited.

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

NOTARY PUBLIC

EXHIBIT C
ATTESTATION CLAUSE, PAST CRIMINAL CONVICTIONS
AS PER LA 38:2227

Appearer, as a Bidder on the below-entitled Public Works Project does hereby attest that:

No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes

- (a) Public Bribery (R.S. 14:118)
- (b) Corrupt Influencing (R.S. 14:120)
- (c) Extortion (R.S. 14:66)
- (d) Money Laundering (R.S. 14:23)

Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity names below has been convicted of: or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation of execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

- (a) Theft (R.S. 14:67)
- (b) Identity Theft (R.S. 14:67.16)
- (c) Theft of a Business Record (R.S. 14:67.20)
- (d) False Accounting (R.S. 14:71)
- (e) Issuing Worthless Checks (R.S. 14:71)
- (f) Bank Fraud (R.S. 14:71.1)
- (g) Forgery (R.S. 14:72)
- (h) Contractors; misappropriation of payments (R.S. 14:202)
- (i) Malfeasance in Office (R.S. 14:134)

<hr/>	<hr/>
Project Identification	Bid Date/Proposal Date
<hr/>	
Name of Bidder (Business Name)	
<hr/>	
Name of Authorized Signatory of Bidder	
<hr/>	
Title of Authorized Signatory of Bidder	
<hr/>	<hr/>
Signature of Authorized Signatory of Bidder	Date

EXHIBIT D
CONTRACT BETWEEN COLLEGE AND CONTRACTOR

STATE OF LOUISIANA

PARISH OF ST. BERNARD

CONTRACT NO: _____

A CONTRACT is made and entered into between Nunez Community College, hereinafter called the "Owner" and _____, hereinafter called the "Contractor", whose business address is _____.

CONTRACT DOCUMENTS: The Contract Documents shall consist of:

1. Bid Response Form
2. Instructions to Bidders
3. Technical Specifications
4. Non-Collusion Affidavit
5. Attestation Clause Past Criminal Convictions
6. Insurance Requirements and Certificates
7. Enumerated Addenda
8. Indemnifications Agreement
9. Contractor's Bid Response
10. Contractor's Performance and Payments Bonds
11. Specifications and Drawings

and this Contract and all are made a part of this Contract by reference with the same force and effect as though said Documents were herein set out in full.

CONTRACT WORK: The Contractor agrees to furnish all materials, labor, tools, equipment and other facilities necessary to perform all work required for:

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

CONTRACT TIME: All work shall be commenced on a date to be specified in a written order of the Owner and shall be fully completed within _____ consecutive calendar days from and after said date.

CONTRACT SUM: The Owner agrees to pay the Contractor for the Work described, the Contract

Sum of: _____ which sum

represents the total Contract price.

Payment of this amount is subject to additions or deductions in accordance with change orders as authorized in writing by the Owner.

GOVERNING LAW: This Contract shall be deemed a contract made in Louisiana and shall be governed by the laws of the State of Louisiana.

ENTIRE AGREEMENT: This Contract and any properly executed amendments thereto, and all Contract Documents listed in this Contract shall constitute the complete and exclusive agreement between parties and supersedes all prior oral or written agreements or communication relating to the subject matter of the Contract.

ACCEPTANCE: In witness whereof, this Contract is executed in triplicate, in Chalmette, Louisiana, this _____ day of _____, 2023.

CONTRACTOR NAME

OWNER

SIGNATURE

SIGNATURE

TITLE

TITLE

WITNESS

WITNESS

WITNESS

WITNESS

EXHIBIT E
PERFORMANCE AND PAYMENT BOND

Bond No: _____

KNOW ALL MEN BY THESE PRESENTS: That _____ as Principal (hereinafter the "Principal") and _____, a company organized and existing in the laws of the State of _____, as "Surety", (hereinafter the "Surety"), are held firmly bound unto Nunez Community College, 3710 Parish Road, Chalmette, LA 70043 as Obligee (hereinafter the "Obligee"), in the sum of _____ and _____ DOLLARS (\$_____) for payment whereof the Principal and Surety bind themselves, and their respective heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has by written agreement dated _____, 2023 (hereinafter "the Contract") entered into a contract with Obligee for _____ (hereinafter the "Project") in accordance with Drawings and Specifications prepared by Obligee and _____. The condition of this Performance and Payment Bond shall be that should the Principal herein not perform the contract in accordance with the terms and conditions thereof, or should said Principal not fully indemnify and save harmless the Obligee, from all cost and damages which he may suffer y said Principal's non-performance or should said Principal not pay all persons who have fulfilled obligations to perform labor and/or furnish materials in the prosecution of the work provided herein, including by way of example, workman, laborers, mechanics, and furnishers of materials, machinery equipment and fixtures, then Surety agrees and is bound to so perform the Contract upon demand by the Obligee and make said payments in accordance with the law.

Provided that any alterations which may be made in terms of the Contract or in the work to be done under it, or the giving by the Obligee of any extensions of time for the performance of the Contact, or in any other forbearance on the part of either the Obligee or the Principal to the other shall not in any way release the Principal or the Surety from their liability hereunder, notice to the Surety of any such alterations, extensions or other forbearance being hereby waived.

IN WITNESS THEREOF, the Principal and Surety have hereunto caused the Bond to be duly executed and acknowledged as set forth below this ____ day of _____, 2023.

This Performance and Payment Bond is accompanied by appropriate Power of Attorney

ATTEST:

(Principal)

By:

SEAL

Name

Title

ATTEST:

(Surety)

By:

SEAL

Name:

Attorney in Fact

END OF DOCUMENT (EXHIBIT E)

LOUISIANA UNIFORM PUBLIC WORK BID FORM

To: _____

(Owner to provide name and address of Owner)

BID FOR: _____

(Owner to provide name of project and other information)

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: _____

Crumb Engineering, LLC and dated: February 1, 2024
(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" (but not alternates) the sum of:
_____ Dollars (\$ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:
All work associated with Fan Coil Units 5, 11, 12-17. Dollars (\$ 0.00)

Alternate No. 2 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:
N/A Dollars (\$ 0.00)

Alternate No. 3 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:
N/A Dollars (\$ 0.00)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.
** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38: 2218.A is attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: _____

(Owner to provide name and address of owner)

BID FOR: _____

(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION: <input type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# ____				
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

Wording for "DESCRIPTION" is to be provided by the Owner.

All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner

BID BOND
FOR

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the _____ (Obligee), in the full and just sum of five (5%) percent of the total amount of this bid, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

PRINCIPAL (BIDDER)

SURETY

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

BY: _____
AGENT OR ATTORNEY-IN-FACT(SEAL)



AIA[®] Document A201[™] – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

THE OWNER:

(Name, legal status and address)

Owner

Owner

Owner

THE ARCHITECT:

(Name, legal status and address)

Crumb Engineering, LLC

4609 Fairfield St

Metairie, LA 70006

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- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

This document has important legal consequences.

Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503[™], Guide for Supplementary Conditions.

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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 or proposal requirements.

§ 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. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 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 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 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.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 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, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and 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 the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, 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 suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk

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and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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 otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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

§ 2.3.4 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. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 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.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 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.

§ 2.5 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 notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for 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 current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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 its 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.

§ 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 2.3.4, 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 submit 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, subject to Section 15.1.7, 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 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be 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 notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative 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 approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 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

§ 3.5.1 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 may be considered defective. 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.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 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.

§ 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 the building permit as well as for other 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.

§ 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 14 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 that an equitable adjustment be made 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, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim 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. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 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 (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 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 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 notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice 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 not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably 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, or fails to provide submittals in accordance with the approved 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 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and 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 how 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.

§ 3.12.6 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 the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect 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 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.

§ 3.12.10.1 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 be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and 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.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

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

§ 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or 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 construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its 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 and 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 the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with 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 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 an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the 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), 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 the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 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.

§ 4.2 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.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general 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.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) 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

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of 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 13.4.2 and 13.4.3, whether or not the 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, 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 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 order 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 Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise 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, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 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. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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 the 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, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice 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 or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was 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 for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

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 that the Contractor, by these Contract 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 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.

§ 5.4 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; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 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 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.

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 term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 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 any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its 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 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 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 notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor’s Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work 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. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 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 that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor 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.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, 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 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.

§ 7.3 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 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine 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 the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, 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 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .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, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 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.

§ 7.3.7 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.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 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 may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

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, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 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 (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended 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.

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§ 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

§ 9.1.1 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.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, 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. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 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 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. 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.

§ 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, suppliers, or other persons or entities that 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 (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or

(3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole 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 in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. 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. 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; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) 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 may 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. 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 suppliers 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 either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 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 supplier 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 Contractor shall reflect such payment on its next Application 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 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 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 and suppliers 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 or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to 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 or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, 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 date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' 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 by the amount of the Contractor's reasonable costs of shutdown, 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.

§ 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 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 will make an inspection to determine whether the Work or designated portion thereof is substantially complete. 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.

§ 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; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and 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 the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the 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 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 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. 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 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.

§ 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, (3) a written statement that the Contractor knows of no 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) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed 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, corrected, 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 the 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;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

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, a Subcontractor, or a Sub-subcontractor; 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 implement, 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 the owners and users of adjacent sites and utilities of the safeguards.

§ 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. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is 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, notice of the 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 and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's 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 the material or substance or who are to perform the task of removal or safe containment of the 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 by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, 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 in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, 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), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous 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 hazardous 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 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances 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 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 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.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 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.

§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 **Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by

an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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 Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination 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, the Contractor shall be entitled to an equitable adjustment to the Contract

Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before 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 any 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 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 and to make a claim for breach of warranty. 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 2.5.

§ 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.

§ 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 of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 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 shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in

Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

§ 13.3.2 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 thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 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 tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 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 13.4.1, 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 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 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.

§ 13.4.4 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.

§ 13.4.5 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.

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

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 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

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- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires 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; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly 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' 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;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or Suppliers;
- .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 reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, 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' 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 Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 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 under Section 14.3.1. Adjustment of the Contract Sum shall include profit. 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 for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of 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; and
- .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.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

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, a change in the Contract Time, 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. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall 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.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

§ 15.1.6.2 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.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker 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 the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 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.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand

for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

SECTION 010400 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A) The General Provisions of the Contract, including General and Supplementary Conditions, and General Requirements apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

- A) Furnish all labor, materials, tools, and equipment, and perform all operations necessary for cutting and patching work indicated or specified.
- B) Definition: "Cutting-and-Patching" is hereby defined to include but is not necessarily limited to the cutting and patching of nominally completed and previously existing work, in order to accommodate the coordination of the work, or to uncover other work for access or inspection, or to obtain samples for testing, or for similar purposes; and is defined to exclude integral cutting-and-patching during the manufacturing, fabricating, erecting and installing process for individual units of work. Drilling the work to install fasteners and similar operations are excluded from the definition of cutting-and-patching.

1.3 QUALITY ASSURANCE

- A) Requirements for Structural Work
 - (1) General: Do not cut-and-patch work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio. Do not cut or core existing concrete joists or beams.
- B) Visual Requirements
 - (1) General: Do not cut-and-patch work which is exposed on the exterior or exposed in occupied spaces of the building, in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the cut-and-patch work, both as judged solely by the University Representative. Remove and replace work judged by the University Representative to be cut-and-patched in a visually unsatisfactory manner. All concrete shall be saw-cut and removed back to nearest expansion joint.

PART 2 - PRODUCTS

2.1 MATERIALS

- A) General: Except as otherwise indicated or approved by the University Representative, provide materials for cutting-and-patching which will result in equal-or-better work than the work being cut-and-patched, in terms of performance characteristics and including visual effect where applicable. Comply with the original materials where feasible and where recognized that satisfactory results can be produced thereby. Provide matching ceiling tile where existing tile is damaged.

PART 3 - EXECUTION

3.1 PREPARATION

- A) Temporary Support: Provide adequate temporary support for work to be cut, to prevent failure. Do not endanger other work.
- B) Protection: Provide adequate protection of other work during cutting-and-patching, to prevent damage; and provide protection of the work from adverse weather exposure.

3.2 CUTTING AND PATCHING

- A) Employ skilled tradesmen to perform cutting and patching. Except as otherwise indicated or approved by the University Representative, proceed with cutting-and-patching at the earliest feasible time, in each instance, and perform the work promptly.
- B) Cut work by methods least likely to damage work to be retained and work adjoining.
- C) Patch with seams that are durable and as invisible as possible. Comply with specified tolerances for the work.
- D) Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.
- E) Where patch occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch, after patched area has received prime and base coats.

END OF SECTION - 010400

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A) This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
- (1) Coordination Drawings.
 - (2) Project meetings.
 - (3) Requests for Interpretation (RFIs).

1.2 DEFINITIONS

- A) RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.3 COORDINATION

- A) Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction 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) 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.
- C) 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:

- (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.
- (8) Startup and adjustment of systems.
- (9) Project closeout activities.

1.4 SUBMITTALS

- A) Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
- (1) Indicate functional and spatial relationships of components of Engineering, structural, civil, mechanical, and electrical systems.
 - (2) Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Engineer for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B) Sheet Size: At least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
- C) Number of Copies: Submit two opaque copies of each submittal. Engineer will return one copy.
- D) Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

1.5 PROJECT MEETINGS

- A) General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
- (1) Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times.

- (2) Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - (3) Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Engineer, within three days of the meeting.
- B) Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, 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.
- (1) Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; 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.
 - (2) Agenda: Discuss items of significance that could affect progress, prepare the meeting agenda
 - (3) Minutes: Record and distribute meeting minutes.
- 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 Engineer of scheduled meeting dates.
 - (2) Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - (3) Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
- D) Progress Meetings: Conduct progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
- (1) Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at

these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

- (2) Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a). Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to 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.
- (3) Minutes: Record the meeting minutes.
- (4) Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a). Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.6 REQUESTS FOR INTERPRETATION (RFIs)

- A) Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 - (1) RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - (2) Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B) Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - (1) Project name.
 - (2) Date.
 - (3) Name of Contractor.
 - (4) Name of Engineer.

- (5) RFI number, numbered sequentially.
 - (6) Specification Section number and title and related paragraphs, as appropriate.
 - (7) Drawing number and detail references, as appropriate.
 - (8) Field dimensions and conditions, as appropriate.
 - (9) Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - (10) Contractor's signature.
 - (11) Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
- C) Hard-Copy RFIs:
- (1) Identify each page of attachments with the RFI number and sequential page number.
- D) Engineer's Action: Engineer will review each RFI, determine action required, and return it. Allow seven working days for Engineer's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
- (1) The following RFIs will be returned without action:
 - a). Requests for approval of submittals.
 - b). Requests for approval of substitutions.
 - c). Requests for coordination information already indicated in the Contract Documents.
 - d). Requests for adjustments in the Contract Time or the Contract Sum.
 - e). Requests for interpretation of Engineer's actions on submittals.
 - f). Incomplete RFIs or RFIs with numerous errors.
 - (2) Engineer's action may include a request for additional information, in which case Engineer's time for response will start again.
 - (3) Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modifications."
 - a). If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.

- E) On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.
- F) RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.
 - (1) Project name.
 - (2) Name and address of Contractor.
 - (3) Name and address of Engineer.
 - (4) RFI number including RFIs that were dropped and not submitted.
 - (5) RFI description.
 - (6) Date the RFI was submitted.
 - (7) Date Engineer's response was received.
 - (8) Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A) This Section includes administrative and procedural requirements for Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A) Action Submittals: Information that requires Architect's responsive action.
- B) Informational Submittals: Information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.
- C) Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- D) Owner Requested Information: Written information that does not require Architect's review and approval. This information may be transmitted directly to the Owner.

1.3 ACTION SUBMITTALS

- A) Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - (1) Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - (2) Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - (3) Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a). Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - (4) Format: Arrange the following information in a tabular format:
 - a). Scheduled date for first submittal.

- b). Specification Section number and title.
- c). Submittal category: Action; informational.
- d). Name of subcontractor.
- e). Description of the Work covered.
- f). Scheduled date for Architect's final release or approval.
- g). Scheduled date of fabrication.
- h). Scheduled dates for purchasing.
- i). Scheduled dates for installation.
- j). Activity or event number.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A) Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
 - (1) Architect may furnish Contractor one set of digital data files of the Contract Drawings for use in preparing Shop Drawings.
 - (2) Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
- 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) Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - (3) Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - (4) 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.
 - (5) Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C) Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit

- submittals enough in advance of the Work to permit processing, including resubmittals.
- (1) Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - (2) Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - (3) Resubmittal Review: Allow 7 days for review of each resubmittal.
 - (4) Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 14 days for initial review of each submittal.
- D) Paper Submittals: Place a permanent label or title block on each submittal item for identification.
- (1) Indicate name of firm or entity that prepared each submittal on label or title block.
 - (2) Provide a space approximately 3 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 for processing and recording action taken:
 - a). Project name.
 - b). Date.
 - c). Name of Architect.
 - d). Name of Contractor.
 - e). Name of subcontractor.
 - f). Name of supplier.
 - g). Name of manufacturer.
 - h). Number and title of appropriate Specification Section.
 - i). Drawing number and detail references, as appropriate.
 - j). Location(s) where product is to be installed, as appropriate.
 - k). Other necessary identification.
 - (4) Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a). Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

- (5) Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without reviewing submittals received from sources other than Contractor.
- a). Transmittal Form for Paper Submittals: Use AIA Document G810, CSI Form 12.1A, or Transmittal Form for Paper Submittals: Provide locations on form for the following information:
- (I) Project name.
 - (II) Date.
 - (III) Name and address of Architect.
 - (IV) Name of Contractor.
 - (V) Name of firm or entity that prepared submittal.
 - (VI) Names of subcontractor, manufacturer, and supplier.
 - (VII) Category and type of submittal.
 - (VIII) Specification Section number and title.
 - (IX) Drawing number and detail references, as appropriate.
 - (X) Remarks.
 - (XI) Signature of transmitter.
- E) Electronic Submittals: Identify and incorporate information in each submittal file as follows:
- (1) Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - (2) Name file with submittal number or other unique identifier, including revision identifier.
 - a). File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 - (3) Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 - (4) Transmittal Form for Electronic Submittals: Use format containing the following information:
 - a). Project name.

- b). Date.
 - c). Name and address of Architect.
 - d). Name of Contractor.
 - e). Name of firm or entity that prepared submittal.
 - f). Names of subcontractor, manufacturer, and supplier.
 - g). Category and type of submittal.
 - h). Specification Section number and title.
 - i). Drawing number and detail references, as appropriate.
 - j). Related physical samples submitted directly.
 - k). Other necessary identification.
 - l). Remarks.
- F) Options: Identify options requiring selection by Architect.
- G) Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H) Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- (1) Note date and content of previous submittal.
 - (2) Note date and content of revision in label or title block and clearly indicate extent of revision.
 - (3) Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- 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: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A) General: Prepare, review, mark approval, sign, date, and submit submittals required by individual Specification Sections.
 - (1) Electronic Submittals: Submit via email as PDF electronic files.
 - a). Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - (2) Paper Submittals - Number of Copies: Copies for Contractor use, plus number below.
 - a). Architect will keep 2 copies of each submittal, unless otherwise indicated.
 - b). Contractor shall provide one copy to be kept at project site during construction.
 - c). Copy(s) as a Project Record Document and for Project Material Manual described elsewhere in Division 1.
- B) Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - (1) Mark each copy of each submittal to show which products and options are applicable.
 - (2) Include the following information, as applicable:
 - a). Manufacturer's catalog cuts.
 - b). Manufacturer's product specifications.
 - c). Standard color charts.
 - d). Statement of compliance with specified referenced standards.
 - e). Testing by recognized testing agency.
 - f). Application of testing agency labels and seals.
 - g). Notation of coordination requirements.
 - h). Availability and delivery time information.
 - (3) For equipment, include the following in addition to the above, as applicable:
 - a). Wiring diagrams showing factory-installed wiring.
 - b). Printed performance curves.
 - c). Operational range diagrams.
 - d). Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - (4) Submit Product Data before or concurrent with Samples.
- C) Shop Drawings: Prepare Project-specific information, drawn accurately to scale.

- (1) Preparation: Fully illustrate requirements in the Contract Documents.
 - (2) Submit Shop Drawings either in PDF electronic format or paper copies.
 - (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 (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
- D) Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- (1) Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - (2) Identification: Attach label on unexposed side of Samples that includes the following:
 - a). Description of Sample.
 - b). Product name and name of manufacturer.
 - c). Sample source.
 - d). Number and title of applicable Specification Section.
 - (3) 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.
 - a). Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b). Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - (4) 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). Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
 - (5) Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, and physically identical with material or product proposed for use, and that show full range of color and

texture variations expected. Samples include, but are not limited to, the following: 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). Number of Samples: Submit 2 sets of Samples. Architect will retain one Sample sets; remainder will be returned.
 - (I) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - (II) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

2.2 INFORMATIONAL SUBMITTALS

- A) General: Prepare and submit Informational Submittals indicated and upon request.
 - (1) Number of Copies: 2 copies, unless otherwise indicated. Architect will not return copies.

2.3 OWNER REQUESTED INFORMATION

- A) General: Prepare and submit Owner requested information required.
 - (1) Number of Copies: Submit 2 copies of each Owner requested information, unless otherwise indicated.
 - (2) Architect will not review this information.
 - (3) This information will be transmitted directly to the Owner.
- B) Owner Requested Information: This information may include -
 - (1) Material Safety and Data Sheets (MSDS) for posting.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A) Contractor's Approval Required: Prior to transmitting submittals to the Architect, check for conformance to Contract Documents and indicate approval by dating, stamping and signing each copy of the shop drawings.
 - (1) Approval by Contractor must be indicated either by "Approved" or "Approved as noted".
 - (2) This is a pre-condition to Architect's review and approval.

- 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.
- 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.
- D) Incomplete and partial submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E) Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01 3300

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 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) Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - (2) Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A) Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B) Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C) Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D) Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 CONFLICTING REQUIREMENTS

- A) General: 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 Engineer for a decision before proceeding.
- B) 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 Engineer for a decision before proceeding.

1.4 SUBMITTALS

- A) Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B) Reports: Prepare and submit certified written reports that include the following:
- (1) Date of issue.
 - (2) Project title and number.
 - (3) Name, address, and telephone number of testing agency.
 - (4) Dates and locations of samples and tests or inspections.
 - (5) Names of individuals making tests and inspections.
 - (6) Description of the Work and test and inspection method.
 - (7) Identification of product and Specification Section.
 - (8) Complete test or inspection data.
 - (9) Test and inspection results and an interpretation of test results.
 - (10) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - (11) Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - (12) Name and signature of laboratory inspector.
 - (13) Recommendations on retesting and reinspecting.
- C) 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.

1.5 QUALITY ASSURANCE

- A) General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B) 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.
- C) Manufacturer Qualifications: A firm experienced in manufacturing products or systems 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.
- 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) 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.
- F) Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - (1) NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - (2) NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G) Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - (1) Build mockups in location and of size indicated or, if not indicated, as directed by Engineer.
 - (2) Notify Engineer seven days in advance of dates and times when mockups will be constructed.
 - (3) Demonstrate the proposed range of aesthetic effects and workmanship.

- (4) Obtain Engineer's approval of mockups before starting work, fabrication, or construction.
- (5) Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- (6) Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- 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 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) Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
- (1) Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a). Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - (2) Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 - (3) Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - (4) Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - (5) Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- 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 as specified in Division 1 Section "Submittal Procedures."

- 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 replaced Work that failed to comply with the Contract Documents.
- E) Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
- (1) Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - (2) Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - (3) Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - (4) Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - (5) Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - (6) Do not perform any duties of Contractor.
- F) 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) Delivery of samples to testing agencies.
 - (6) Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - (7) Security and protection for samples and for testing and inspecting equipment at Project site.

G) Coordination: Coordinate sequence of activities to accommodate required quality-assurance and 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.

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) Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

(2) Comply with the Contract Document requirements for Division 1 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 4000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A) This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.2 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. 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.

1.3 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.

1.4 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.
- B) Delivery and Handling:

- (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.
- C) Storage:
- (1) Store products to allow for inspection and measurement of quantity or counting of units.
 - (2) Store materials in a manner that will not endanger Project structure.
 - (3) Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - (4) Store cementitious products and materials on elevated platforms.
 - (5) Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - (6) Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - (7) Protect stored products from damage and liquids from freezing.

1.5 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 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) Refer to Divisions 2 through 26 Sections for specific content requirements and particular requirements for submitting special warranties.
- C) Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- 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," Engineer will make selection.
 - (5) Where products are accompanied by the term "match sample," sample to be matched is Engineer's.
 - (6) Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

- B) Product Selection Procedures:
 - (1) Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 - (2) Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 - (3) Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.

2.2 COMPARABLE PRODUCTS

- A) Conditions: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
- (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 Engineers and owners, if requested.
 - (5) Samples, if requested.
 - (6) Comparable products/substitutions are only allowed prior to the bid. Please refer to Section 4.3 in the Instructions to Bidders.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 01 7000 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 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) Progress cleaning.
 - (5) Starting and adjusting.
 - (6) Protection of installed construction.
 - (7) Correction of the Work.

1.2 SUBMITTALS

- A) Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- B) Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

- A) 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 mechanical and electrical systems and other 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.

- (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) Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - (2) Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - (3) Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - (4) Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

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 diagrammatically 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 Engineer. 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 Engineer promptly.
- 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 Engineer 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.
- E) Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

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.
- B) Benchmarks: Establish and maintain a minimum of two 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.
- C) Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - (1) Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

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.
- 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 Engineer.
 - (2) Allow for building movement, including thermal expansion and contraction.
 - (3) Coordinate installation of anchorages. 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.

- 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 (27 deg C).
 - (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 in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G) 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.

- H) 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.
- I) 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.
- J) 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 1 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 1 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.
- 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 7000

SECTION 01 7700 - 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) Final cleaning.

1.2 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A) Submit normal correspondence format, on Contractor's letterhead appropriately dated and referenced (project name). 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.

1.3 SUBSTANTIAL COMPLETION

- A) Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following.
- (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) Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
 - (3) Complete final cleaning requirements.
 - (4) Touch up, repair, and restore marred areas and exposed finishes to eliminate visual defects caused by construction operations.
- 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 satisfactory 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) Re-inspection: Request re-inspection 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.

1.4 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 1 Section "Payment Procedures."
 - (2) Submit written statement that Substantial Completion inspection List of Incomplete Items (punch list) have been completed or otherwise resolved for acceptance with explanation therein.
 - (3) Submit required documentation indicated elsewhere in these Contract Documents.
- 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) Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 PROJECT RECORD DOCUMENTS

- A) General: Do not use Project Record Documents for construction purposes. Protect from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B) Record Drawings: Maintain and submit one set of Contract Drawings and Shop Drawings.
- (1) Mark Record Drawings to show the actual installation where installation varies from that shown originally.
 - 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, and not later 24-hours after receiving information. Record and check the markup before enclosing concealed installations.
 - c). Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - (2) Mark with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A) General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances, and Federal and local environmental and anti-pollution regulations.
 - (1) Leave Project clean in condition same as prior to beginning of construction operations.

- B) Cleaning: Complete the following cleaning operations before requesting inspection for certification of Substantial Completion:
 - (1) Clean Project site, yard, and grounds, in areas disturbed by construction activities, of rubbish, waste material, litter, and other foreign substances.
 - (2) Restore site, fill in depressions, wheel ruts and fine grade property affected by construction traffic and temporary facilities during construction operations.
 - (3) Traverse site areas affected by construction operations with metal detector(s) to remove fasteners and residual metal debris.
 - (4) Sweep and clean entire building. Remove petrochemical spills, stains, and other foreign deposits.
 - (5) Remove tools, construction equipment, machinery, and surplus material from Project site.
 - (6) Touch up and otherwise repair and restore marred surfaces affected by construction operations.

- C) 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

SECTION 01 7810 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A) This Section includes administrative and procedural requirements for Project Record Documents, including the following:
- (1) Record Drawings.
 - (2) Record Product Data.

1.2 SUBMITTALS

- A) Record Drawings: Comply with the following:
- (1) Number of Copies: Submit one set(s) of marked-up Record Prints at Substantial Completion.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A) Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
- (1) Preparation: 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 would be difficult to identify or measure and record later.
 - b). Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - (2) Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 - (3) Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - (4) Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B) Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

(1) Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

(2) Identification: As follows:

- a). Project name.
- b). Date.
- c). Designation "PROJECT RECORD DRAWINGS."
- d). Name of Engineer.
- e). Name of Contractor.

2.2 RECORD PRODUCT DATA

A) Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

(1) Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

(2) Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

(3) Note related Change Orders and Record Drawings where applicable.

2.3 MISCELLANEOUS RECORD SUBMITTALS

A) 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.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A) Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B) Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

END OF SECTION 01 7810

SECTION 01 7820 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A) This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - (1) Emergency manuals.
 - (2) Operation manuals for systems, subsystems, and equipment.
 - (3) Maintenance manuals for the care and maintenance of products, systems and equipment.
- B) See Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 SUBMITTALS

- A) Manual: Submit one copy of each manual in final form at least 15 days before final inspection. Engineer will return copy with comments within 15 days after final inspection.
 - (1) Correct or modify each manual to comply with Engineer's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Engineer's comments.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

- A) Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.
- B) Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - (1) Revise list below to suit Project.
 - (2) Subject matter included in manual.
 - (3) Name and address of Project.
 - (4) Name and address of Owner.
 - (5) Date of submittal.
 - (6) Name, address, and telephone number of Contractor.
 - (7) Name and address of Engineer.
 - (8) Cross-reference to related systems in other operation and maintenance manuals.

- C) Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D) Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - (1) Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a). Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 - (2) Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - (3) Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
 - (4) Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a). If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b). If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

- A) Content: Organize manual into a separate section for type of emergency, emergency instructions, and emergency procedures.
- B) Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component for fire, flood, gas leak, water leak, power failure, water outage, equipment failure, and chemical release or spill.

- C) Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D) Emergency Procedures: Include instructions on stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

2.3 OPERATION MANUALS

- A) Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.
- B) Descriptions: Include the following:
 - (1) Product name and model number.
 - (2) Manufacturer's name.
 - (3) Equipment identification with serial number of each component.
 - (4) Equipment function.
 - (5) Operating characteristics.
 - (6) Limiting conditions.
 - (7) Performance curves.
 - (8) Engineering data and tests.
 - (9) Complete nomenclature and number of replacement parts.
- C) Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.
- D) Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E) Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

- A) Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B) Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, ad-

- dress, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C) Product Information: Include the following, as applicable:
 - (1) Product name and model number.
 - (2) Manufacturer's name.
 - (3) Color, pattern, and texture.
 - (4) Material and chemical composition.
 - (5) Reordering information for specially manufactured products.
 - D) Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.
 - E) Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
 - F) Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A) Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B) Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C) Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:
- D) Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions, and demonstration and training videotape if available, that detail essential maintenance procedures:

- E) Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- F) Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G) Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H) Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A) Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B) Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C) Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
- D) Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
- E) Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - (1) Do not use original Project Record Documents as part of operation and maintenance manuals.
- F) Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 7820

SECTION 02 1000 - DEMOLITION

PART 1 - GENERAL

1.1 SCOPE

- A) Perform all demolition and clearing work as specifically indicated and as otherwise required to achieve the results indicated on the Drawings and in the Project Manual.
- B) Demolition indicated on the Drawings is for the purpose of clarifying conditions and is not intended to portray the full scope of all demolition work.

1.2 PRECAUTIONS

- A) Particular precautions shall be exercised in the demolishing of components above and around occupied spaces to prevent injury to persons and property. Do not leave pipes, stubs, brackets and other components loose without adequate support and anchorage. Safety of persons during and after construction shall be the Contractor's primary concern. The Contractor shall be responsible to determine and assure that execution of the Work under this Contract in no way endangers occupants of the buildings, site, or any workmen.

1.3 PROTECTION

- A) The Contractor shall be responsible for protecting all components and contents of the buildings, all improvements on the site, all building systems and all equipment, both fixed and movable, which may be exposed to damage by the work of this Contract. Particular care must be taken with sensitive equipment which cannot be readily relocated for execution of the work in the areas in which such equipment is located.

1.4 COORDINATION

- A) All demolition work shall be carefully coordinated with the construction schedule and the Owner's activities.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REMOVAL

- A) Limit demolition and removal to the areas and extent necessary to accomplish the finished results intended. Any demolition beyond what is required shall be replaced

to match existing. All demolished materials not indicated to be reused or turned over to the University shall be removed promptly from the site by the Contractor.

- B) It is impossible to show every detail of demolition on the drawings. However, when removing existing equipment, piping, conduit and structural elements, remove items back to a point where they are structurally secure and back to a point where they are no longer visible or exposed in occupied spaces or in the way of activity or passage or where these elements will no longer pose a safety hazard. All components shall be terminated in a safe and proper manner.

3.2 SALVAGE

- A) Unless specifically noted on the Drawings or in the Project Manual or indicated at the Pre-Bid Meeting to be saved, all components being removed shall be removed from the site under this Contract. All items indicated to be reused shall be carefully stored for incorporation into the finished project. These items shall be the Contractor's responsibility during the duration of this Contract.

END OF SECTION 02 1000

SECTION 22 0700 - INSULATION

PART 1 - GENERAL

1.1 WORK SPECIFIED HEREIN

- A) Furnish all labor, materials, equipment, and services necessary for the installation of all insulation as herein described and as indicated on the drawings. The insulation shall be applied by a licensed Insulation Contractor in strict accordance with the best practices of the trade. All insulation material, coverings, adhesive, vapor barriers and tapes shall have a flame spread classification not to exceed 25 and a smoke development not to exceed 50.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A) Certain items in this specification are listed by manufacturer and/or manufacturer's model number to establish general style, type, character, and quality of the product desired.
- B) Where no manufacturer or model number is given, any product meeting performance or design criteria, or referenced trade association standard may be used and Pre-Bid Approval is not required.

2.2 CHILLED WATER PIPING (INTERIOR)

- A. Insulate chilled water system pipe with glass fiber pipe insulation with factory applied white all service jacket, with self-sealing lap (ASJ-SSL).
- B. Insulate fittings, flanges, and valves with performed insulation with PVC premolded one-piece fitting covers, with fiberglass inserts. Premolded or shop fabricated glass fiber cover may be used in lieu of above at the Contractor's option. Optional covers to be given a smoothing coat of finishing cement, in exposed areas and vapor sealed in all areas with vapor barrier mastic coating, reinforced with white glass fabric. Insulation thickness to be 2" for pipe sizes 4" and below.
- C. Adhere longitudinal laps and butt strips of jacket with factory applied pressure sensitive tape system, or stapled on 2-inch centers with Monel staples.

- D. Provide an isolating vapor seal between pipe insulation jacket and pipe at butt joints of insulation at fittings, flanges, valves, hangers and at 21-foot intervals on continuous runs, using vapor barrier mastic coating.

2.3 AIR CONDITIONING DRAINS

- A. Insulate all air conditioning condensate drains fittings, flanges and valves with flexible foamed plastic tubing insulation, J-M Aerotube 11, Rubatex, or approved equal. Thickness to be 3/4 inch.
- B. Insulate all horizontal waste piping above ground that receives A/C condensate from drain to vertical stack. Also insulate the "P" trap of those drains. Insulation shall be the same as condensate drain except thickness shall be 1/2 inch for all pipe sizes.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND INSTALLATION

- A) All insulation shall be applied per manufacturer's specifications and installation requirements.
- B) Insulation shall be applied over clean dry surfaces after all tests have been performed and approved.
- C) Methods of application and other details not specified herein shall be in accordance with manufacturer's recommendations, which shall constitute minimum standards.
- D) Sheet Metal Saddles - 10" long shall be provided on all hangers supporting insulated lines. They shall be fabricated to conform with the outside diameter of the pipe covering and shall be fabricated from 22-gauge sheet iron for pipe through 2-1/2" 20-gauge sheet iron for pipes through 8" and 16 gauge for all pipes over 8".
- E) A rigid insulation material shall be used at each pipe hanger as an insert and the pipe covering shall pass full thickness through the hangers.
- F) On all outdoor piping insulation above ground, provide aluminum jacket 0.016 inch thick with longitudinal z-joint secured with preformed 2" wide butt strips, as manufactured by KNAUF, MANVILLE or approved equal. Provide preformed aluminum fitting cover on all fittings.

END OF SECTION 22 0700

SECTION 23 0500 – GENERAL MECHANICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A) The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

- A) The work to be done under this heading includes the furnishing of labor, materials, equipment, and service necessary for and reasonably incidental to the proper completion of all mechanical work as shown on the drawings and herein specified.
- B) Visit and examine the job site, and with all authorities concerned in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed. Pay all costs and fees for utility connections.
- C) Materials and equipment shall be new, except where otherwise indicated, of the best quality, with same brand of manufacturer for all similar material.
- D) All work shall be performed in a neat and workmanlike manner, and in accordance with all codes, standards, and requirements of the industry.
- E) In general, provide the installation of piping, fittings, equipment, etc.
- F) Regardless of titles and subdivisions herein employed, consider these specifications as one complete document with General Section applying to all other sections. All bidders are cautioned to read entire specifications and to thoroughly familiarize themselves with all requirements thereof.
- G) Check all specifications and all drawings and bring to attention any conflicts or variations as shown as noted.
- H) Specifications and accompanying drawings apply to all contracts or sub-contracts entered into for supplying material or labor for construction of work specified herein and shown on drawings.
- I) Protect Owner and his agents including Construction Manager, Architect and/or Engineer from any and all damages and expense arising from fulfillment of contract and at completion of work repair all damages done.
- J) For any points which are not clear, or for items and/or details which the Contractor feels are in need of clarification, consult the Architect before submission of a proposal.

- K) The drawings and the specifications are complementary and what is shown and/or called for on one shall be furnished and installed the same as if shown and/or called for in the other.
- L) In case of discrepancies and/or ambiguities in the drawings and/or in the specifications, the Architect shall be consulted prior to submission of a proposal. Failure to do so on the part of the successful bidder shall be construed as explicit agreement on his part to abide by the Architect's decision in such matters.
- M) The word "provide" as used in these Specifications and on the Drawings shall be termed to mean "furnish and install".
- N) Contractor shall include in base bid the removal of the existing chillers and installation of a new chillers shown on the drawings. Contractor shall include all material and all costs for complete installation, including meter fees and connection fees.
- O) If the Contractor notices during the bidding any items of the contract documents which will violate any applicable code, these items shall be brought to the attention of the Architect before the bid date. Failure to bring these items to the attention of the Architect shall be construed as explicit agreement that the Contractor has included in his bid price any and all modifications necessary to complete the project in accordance with all applicable codes

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A) All exposed piping and other equipment requiring painting will be painted under PAINTING SECTION. Leave all these surfaces clean of oil, dirt, plaster, etc., ready for painting section's work.
- B) Power wiring for all equipment shall be done under ELECTRICAL SECTION.
- C) Piping penetrations through fire rated partitions/floors shall be fire sealed in accordance with the UL fire resistance directory. See Sealant Specification for materials. The integrity of the fire rating, as indicated on the architectural drawings, shall be maintained.
- D. Furnish under this section all heating, air conditioning, ventilating and other mechanical systems controls, starters, firestats, relays, and related equipment.
- E. Openings for all access doors, relief and return air grilles, etc., shall be provided under the respective trade sections.

- F. Curbs, flashings, etc., for exhaust fans, vents, etc., shall be provided under the respective sections.
- G. All HVAC control wiring shall be furnished and installed by Building, Automation and Temperature Control Contractor.
- H. Piping and ductwork penetrations through fire rated partitions/floors shall be fire sealed in accordance with the UL fire resistance directory. See Joint Sealant Specification for materials. The integrity of the fire rating, as indicated on the architectural drawings, shall be maintained.

Manufacturers:

1. 3m Model 2000.
2. Spec Seal Model 100.
3. Hilti.

General Purpose Fire Stopping Sealant: Water based non-slumping, premixed sealant with intumescent properties, rated for 3 hours in accordance with ASTM E814 and UL 1479.

General Purpose Vibration Resistant Fire Stopping Sealant: Silicone based, non-slumping, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479.

Plastic Pipe Systems Fire Stopping Sealant: Silicone based, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479 with metal collars.

1.4 QUALITY ASSURANCE

- A) The Contractor bidding on this portion of the work must be fully experienced in installations of equal size, complexity, and quality, and must be licensed to perform such work as required by the Louisiana State Legislature, R.S.37:2152-2163.
- B) In bidding he acknowledges that he fully understands the scope of work and design, and has the ability for the contract price to assemble and install the equipment,

- piping and ductwork shown or specified, so as to mold same into a satisfactory workable system and arrangement.
- C) Contractor shall recognize that a fault or error in his work remains his responsibility regardless of whether such difficulty was discovered after the work had progressed, and shall make corrections at no cost to the Owner.
 - D) Adequate and competent constant supervision shall be provided by Contractor to assure that work is done in accordance with good standard practice and workmanship and with intent of drawings and specifications. Contractor shall recognize that amount of information and detail could be provided to contract documents is limitless and could extend into every minute detail and sequence of operations, to a point where only workmen would be required, without drawing on ability, experience, and ingenuity of the Contractor.
 - E) All work shall be installed in strict accordance, with all existing local and state codes and ordinances, with National Board of Fire Underwriters
 - F) This Contractor shall secure all permits and inspections and shall pay all fees and taxes and shall provide Owner with certificates of approval from agencies having jurisdiction over various phases of work.
 - G) Contractor shall maintain and service all equipment until time of acceptance by Owner. Contractor shall include all required service access in the installation as required by the manufacturer and governing codes.
 - H) Prior to starting any work, the Contractor shall submit a quality assurance plan for approval by the Architect. In the quality assurance plan, the Contractor shall provide the following information:
 - (1) List of all subcontractors and equipment suppliers.
 - (2) List of all foreman and job superintendents including job experience for all trades.
 - (3) Construction time schedule demonstrating coordination with other trades and showing detailed timelines for test and balance and commissioning being completed prior to final punch list inspection
 - I) HVAC systems shall be coordinated with other systems and trades to include but not be limited to: Electrical systems, fire alarm, security systems, telephone and data systems.
 - J) Verification of Dimensions: The Contractor shall be responsible for the coordination and proper relation of Contractor's Work to the building structure and to the Work of all trades. The Contractor shall visit the premises and become thoroughly familiar with all details of the Work and working conditions, to verify all dimensions in the

- field, and to advise the Architect/Engineer of any discrepancy before performing any Work. Adjustments to the Work required in order to facilitate a coordinated installation shall be made at no additional cost to the Owner or the Architect/Engineer.
- K) All dimensional information related to new structures shall be taken from the appropriate Drawings. All dimensional information related to existing facilities shall be taken from actual measurements made by the Contractor on the Site.
- L) The Drawings are subject to the requirements of Reference Standards, structural and architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of Work. Work shall be organized and laid out so that it will be concealed in furred chases and suspended ceilings, etc., in finished portions of the building, unless specifically noted to be exposed. All exposed Work shall be installed parallel or perpendicular to the lines of the building unless otherwise noted.
- M) When the Drawings do not give exact details as to the elevation of pipe and ducts, the Contractor shall physically arrange the systems to fit in the space available at the elevations intended with proper grades for the functioning of the system involved. Piping and duct systems are generally intended to be installed true and square to the building construction, and located as high as possible against the structure in a neat and workmanlike manner. The Drawings do not show all required offsets, control lines, pilot lines and other location details. Work shall be concealed in all finished areas.
- N) Where core drilling of floor or wall penetrations is required, Work shall be performed in accordance with Division 03 Specifications. Where applicable Division 03 Specifications are not included in the Project, core drilling shall be in accordance with generally accepted standards, and be performed by licensed personnel where applicable.
- O) Certify in writing that neither the Contractor nor any of Contractor's subcontractors or suppliers will supply any materials that contain any asbestos in any form for this Project.

1.5 SUBMITTALS

- A) Shop Drawings and Submittal Data required:

(1) Submit to the Architect for review, complete descriptive information and

dimensional data on all items of equipment, materials and accessories, including

duct, equipment and sprinkler layouts. Piecemeal submissions shall not be approved. Written approval thereof must be obtained before ordering or installation. The following shall be submitted:

Insulation

Fan Coil Units

Equipment Layout Drawings

Controls

- (2) Shop drawings and submittal data shall be considered to be instruments of service only and submitted for the sole purpose of convenience to the Contractor to assist him in the performance of the contract. The Architect's review of the shop drawings and submittal data shall not supersede these specifications, the accompanying drawings, or the contract terms, unless specifically covered by a properly executed change order, and then only to the extent specifically and explicitly stipulated therein.
- (3) Submit in accordance with requirements of Architectural Sections, Division 1.
- B) After completion of project Contractor shall turn over to the Architect complete operating and maintenance instructions including listing of supply and repair items and locations of places to purchase same. Comply with requirements of Division 1 Sections.
- C) Substitutions:
 - (1) All material, equipment, methods, and accessories entering into the work under this section of contract are subject to approval or disapproval of the Owner. Approval of any manufacturer, material, or product shall not constitute a waiver of Owner's right to demand full compliance with contract requirements, including shape, size, quality and performance.
 - (2) Equality of materials is that established by opinion of Owner. Decision of Owner is final.
 - (3) Whenever a material or article of equipment is specified by use of a proprietary name, or by naming the manufacturer or vendor, any material or article which will perform adequately the duties imposed by the design will be considered for substitution, providing it is of equal substance, and function, meets specifications, and is aesthetically acceptable to the Owner. Refer to Division 1 Sections for approval procedures.
 - (4) Literature, technical data, etc., includes complete data and samples, if necessary, with submissions for substitutions. Burden of proof that material

offered for substitution is equal, or superior, in construction and efficiency to that named, rests on Contractor, and unless proof is satisfactory to Architect, substitution will not be approved.

D) See Specifications for "As-Built" requirements.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A) Take necessary precautions to protect all material, equipment, apparatus, and work from damage. Failure to do so to the satisfaction of the Architect will be sufficient cause for the rejection of the material, equipment, or work in question. Contractor is responsible for the safety and good condition of the materials installed until final acceptance by the Owner.

B) All equipment, ductwork, and materials shall be delivered to the Project Site clean and sealed for protection.

C) Take particular care not to damage the existing construction in performing Work. All finished floors, step treads and finished surfaces shall be covered to prevent any damage by workers or their tools and equipment during the construction of the Project.

D) Equipment and materials shall be protected from rust and dust/debris both before and after installation. Any equipment or materials found in a rusty condition at the time of final inspection must be cleaned of rust and repainted as specified elsewhere in these Specifications.

E) All material affected by weather shall be covered and protected to keep the material free from damage while material is being transported to the Site and while stored at the Project Site.

F) During the execution of the Work, open ends of all piping and conduit, and all openings in equipment shall be closed when Work is not in progress, and shall be capped and sealed prior to completion of final connections, so as to prevent the entrance of foreign matter.

G) All equipment shall be protected during the execution of the Work. All ductwork and equipment shall be sealed with heavy plastic and tape to prevent build-up of dust and debris.

H) All ductwork and air handling equipment shall be wiped down with a damp cloth immediately before installation to ensure complete removal of accumulated dusts and foreign matter.

1.7 JOB CONDITIONS

- A) Accompanying drawings, including plans, details, diagrams, notes, etc., are shown to limit and explain structural conditions, construction requirements, sizes, capacities and method of installation and erection. Structural and other conditions may require certain modifications and adjustments from conditions shown. Such deviations are permissible; however, specific sizes capacities and requirements affecting the satisfactory performance and operation of the installation shall remain unchanged. Make allowance for normal job conditions and interferences.
- B) Whenever it becomes necessary to shift ducts or pipes or to change shape of ducts, such changes shall be referred to Architect for approval.
- C) Ask for details whenever uncertain about method of installation. Lack of details not requested shall not excuse improper installation and correction shall be responsibility of Contractor. Contractor shall consult manufacturer for details specific to their items of equipment and include all piping, fittings, supports, controls, wiring, ductwork, valves, etc. required by the equipment manufacturer in their installation manuals.
- D) Schedule and perform all mechanical work to avoid delays to the Contractor and other trades.
- E) In addition to the basic work covered under this contract, the Contractor shall plan and schedule the work to permit continuous operation of essential services of existing facilities. Planning shall also include scheduling necessary interruptions of service on water lines, drain lines, etc., to existing building at times when such interruptions will cause minimum interference with existing routine and services. All such interruptions shall be made only after consultation with the Owner. This is extremely important since included in the work is a relocation and rerouting of and connecting to existing facilities, piping, etc. No additional compensation will be allowed for failure to be so informed.
- F) It is essential that all adjacent areas of the school be kept in operation at all times, except when specific permission is given to contrary. Before any lines or equipment are shut down for disconnecting, tie-ins, or rearranging of services, make arrangements with Architect to do this work at night, or Sunday, or at special time of day or year with length of shutdown agreed upon before work is begun. Contractor to bear any overtime or work costs in the connection.
- G) All piping, cleanouts and covers, and other mechanical items in way of construction or remodeling, shall be rerouted, relocated or otherwise adjusted to work out with such construction or changes shown or specified in any or all of various sections of

specifications. Unknown piping that is encountered will be referred immediately to Architect for method of disposition before continuation of work.

- H) Furnish detailed duct layout and equipment room shop drawings based on field measurements and actual job conditions.

1.8 GUARANTEE AND SERVICE

- A) Guarantee all equipment, materials, and workmanship for a period of one (1) year following date of acceptance, unless noted otherwise. All HVAC compressors shall have a minimum 5-year parts and labor warranty. See 233000 for additional warranties related to HVAC equipment.
- B) During the period of guarantee any defects in equipment, materials, or workmanship shall be promptly corrected without cost to the Owner.
- C) Guarantee includes equipment capacity and performance ratings specified without excessive noise levels. Any deficiencies in equipment capacity specified shall be promptly corrected.
- D) Guarantee does not include maintenance items.

PART 2 - PRODUCTS

GENERAL

- A) All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B) All equipment installed shall have local representation, local factory authorized service, and a local stock of repair parts.
- C) Responsibility for furnishing proper equipment and/or material and ensuring that equipment and/or material is installed as intended by the manufacturer, rests entirely upon the Contractor. Contractor shall request advice and supervisory assistance from the representative of specific manufacturers during the installation.
- D) All materials, unless otherwise specified, shall be new, free from all defects, suitable for the intended use and of the best quality of their respective kinds. Materials and equipment shall be installed in accordance with the manufacturer's recommendations and the best standard practice for the type of Work involved. All Work shall be executed by mechanics skilled in their respective trades, and the installations shall provide a neat, precise appearance. Materials and/or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job Site but shall be replaced with new materials and/or equipment.
- E) Materials and equipment manufactured domestically are preferred when possible. Materials and equipment that are not available from a domestic manufacturer may be by a non-domestic manufacturer provided they fully comply with Contract Documents.

- F) Prevention of Rust: Standard factory finish will be acceptable on equipment specified by model number; otherwise, surfaces of ferrous metal shall be given a rust inhibiting coating.

2.2 TOOLS AND SCAFFOLDING

- A) Furnish all tools, equipment, scaffolding and other facilities required to properly and expeditiously perform the work.

2.3 SIPHON PREVENTORS

- A) Furnish and install on all equipment and fixtures requiring same, backflow preventors or vacuum breakers of a type approved by the Louisiana Health and Human Resources. Water connections to fixtures and equipment shall be made in such a way as to prevent back siphonage when the water supply is out or the pressure drops. Provide reduced pressure type back flow preventors where indicated on drawings or required by Code. They shall be Watts series 900 or Febco Series 825, size as indicated on drawings.

2.4 SLEEVES AND THIMBLES

- A) Pipe sleeves - wrought iron or cast iron of sufficient size for piping and installation to be installed in floors, walls below grade, and grade beams where piping passes through.
- B) Thimbles above grade - heavy galvanized steel of proper size to allow freedom of piping and insulation, set in floor or roof slab as work progresses, also to be installed in wall and partitions where piping passes through.
- C) Thimbles below grade - same as pipe sleeves above.
- D) Sleeves through floors extend 1/4" above finished floor. Caulk around and seal all piping in chases and piping passing through floor slab.
- E) Provide sleeve seals and shields for all pipe penetrations of ground floor slab.
- F) Provide fire-stopping in all pipe penetrations of rated floors and walls.
- G) Provide escutcheons for all exposed piping penetrating walls, ceilings or floors.

2.5 BUCKS, GROUNDS AND CHASE

- A) Be responsible for proper location and sizes or for any errors or omission in placing same.
- B) Failure to inform the General Contractor promptly of such requirements shall not relieve the Mechanical installer of the responsibility for providing a complete mechanical system.

2.6 HANGERS

- A) Horizontal piping above grade without hubs shall be rigidly supported. Distance between pipe supports:
- | | |
|--------------------------|----------------|
| (1) 1/2" pipe | 6'-0" maximum |
| (2) 3/4" pipe | 7'-0" maximum |
| (3) 1" pipe | 8'-0" maximum |
| (4) 1 1/4" pipe | 9'-0" maximum |
| (5) 1 1/2" pipe and over | 10'-0" maximum |
- B) Hangers shall be similar to "Split Ring" type.
- C) Metal strap or wire will not be acceptable.
- D) For two or more systems of piping run parallel and with same grade trapeze hangers may be used.
- E) Use #22-gauge galvanized sheet steel saddles between the pipe covering and each pipe hanger on all insulated lines. Saddles shall extend along pipe runs and at least halfway up piping on each side.
- F) Rods supporting pipe hangers shall have the following dimensions:
- | | |
|-----------------------|----------|
| (1) 1/2" to 2" pipe | 3/8" rod |
| (2) 2-1/2" to 3" pipe | 1/2" rod |
| (3) 4" to 5" pipe | 5/8" rod |
| (4) 6" pipe | 3/4" rod |
| (5) 8" through 12" | 7/8" rod |
- G) Rods for trapeze hangers shall be a minimum of 3/8" and shall have the equivalent cross section, listed above, per pipe supported.

2.7 PAINTING AND IDENTIFICATION

- A) Equipment, including pumps, motors, and similar factory fabricated and assembled units shall be furnished with factory applied protective prime coat paint of finished baked enamel. Equipment surfaces damaged during course of construction or shipment shall be refinished by the Mechanical Contractor.
- B) Uncoated black ferrous piping and fittings shall be cleaned under this section and painted with one coat of enamel paint under PAINTING SECTION. Color of piping shall be selected by Architect. Hangers and supports shall be coated by dipping or brush painting with one coat of asphalt varnish. Steel frame equipment supports shall be cleaned and painted with one coat of aluminum paint.
- C) Detached motor controllers, disconnects, etc., shall be identified with metal or plastic plates with etched letters to completely identify service of electrical equipment.

- D) Major control and sectionalizing valves shall be identified by means of etched brass plates bracketed to valve handle. Contractor shall prepare schedule of such identifying plates for Architect's approval.
- E) All chilled water piping, heating water piping, condenser water piping, and domestic water piping shall be labelled. The label shall designate the piping system and direction of flow. The piping shall have a color marker applied every 5' to indicate service as follows:
- Chilled Water – Safety Blue
 - Heating Water – Safety Yellow
 - Condenser Water – Hunter Green
 - Domestic Cold Water – Safety Green
- F) NAMEPLATES
- G) Each major component of equipment shall have the manufacturer's name, address, and catalog number on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of Final Inspection.
- H) Nameplates shall be black laminated rigid phenolic with white core. Nameplate minimum size shall be 1 inch high by 3 inches long with 3/16-inch-high engraved white letters.
- I) Nameplate Fasteners: Fasten nameplates to the front of equipment only by means of stainless steel self-tapping screws. Stick-ons or adhesives will not be allowed unless the NEMA enclosure rating is compromised, then only epoxy adhesive shall be used to attach nameplates.
- J) Nameplate Information: In general, the following information is to be provided for the types of electrical components or enclosures supplied with equipment.
- K) Individual Starters, Contactors, Disconnect Switches, and Similar Equipment: Identify the device, and voltage characteristics source and load served.
- L) MOTOR CONTROLLERS AND ELECTRIC INTERLOCKS
- A. Except where otherwise specified or as included as an integral part of the normal and customary mechanical equipment, each starter shall be furnished by other divisions complete with the required control power transformers and auxiliary contacts necessary for control interlocks and wired by a licensed electrician in accordance to governing codes.
 - B. In fractional horsepower 120v-single phase roof or wall mounted fans, a motor rated manual starter/disconnect with on-off snap switch type with

soldered ratchet overload protection shall be furnished by the Contractor furnishing the fans and wired by a licensed electrician in accordance to governing codes.

- C. When interlocking of equipment is required all wiring in excess of fifty (50) volts to be provided by a licensed master electrician and coordinated by the Contractor. All other wiring fifty (50) volts or less or as required by the controls/energy management system shall be fully coordinated by the Contractor to provide and ensure a complete and fully operational system. Provide all conduit for controls and or power wiring in accordance with Division 26 requirements, and installed by licensed electrician and coordinated by the Contractor.
- D. Except for such items that are normally wired up to their point of manufacture and so delivered and unless specifically noted to the contrary herein, the Contractor shall do all electric wiring of every character for interlocking, pilot, and control in accordance with methods and materials described within Division 26 of these Specifications. This includes conduits and mounting of all electrical devices.
- E. Furnishing of complete wiring diagrams showing proper control and interlock wiring shall be work under the trade supplying the equipment. Diagrams shall be based on the approved equipment for this project and shall be complete integral drawings, not a series of manufacturers' individual diagrams.
- F. The electrical design and Drawings are based on the equipment scheduled and shown on the Mechanical Drawings and should any mechanical equipment requiring changes to the electrical design be approved, the required electrical changes shall be made at no cost to the Owner.

2.8 CONTROL POWER AND EQUIPMENT POWER FOR CONTROLS

- A) Control power, whether it be DDC, 24 volt, or 120 volt, should be delivered to each piece of mechanical equipment, fire/smoke dampers, and/or control panels whether or not it is specifically indicated on the Contract Drawings.

- B) It is the Contractor's responsibility to include in his or her bid all costs in connection with control wiring, and/or power, whether or not it is specifically indicated. Regardless of how large in nature or how incidental, no additional compensation will be approved by the Owner's representative or Design Professionals concerning a failure on the Contractor's part to include these costs in bid proposal or a failure on the Contractor's part to properly coordinate these important functions.

- C) Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with Specification Division 26 and all national, state, and local electrical codes. Insulated wire should use copper conductors and shall be UL Listed for 200°F minimum service.

- D) All control wiring in mechanical, electrical, telephone rooms or exposed to be installed in raceways. All other wiring to be installed neatly and inconspicuously per local code requirements. If local code allows, control wiring above accessible ceiling spaces may be run with plenum rated cable (without conduit). All conduit outdoors shall be EMT with rain tight fittings. Line voltage control wiring shall be run in EMT.

2.9 SAFETY GUARDS

- A) Provide safety guards for moving equipment such as fan belt drives and motor drive couplings.
- B) Use OSHA approved belt guards and couplings guards. Provide 1/2 inch hole in guard at center of shaft of driven equipment where belt type drives are used.

PART 3 - EXECUTION

3.1 PREPARATION

Cooperate with trades of adjacent, related or affected materials or operations, and with trades performing continuations of this Work in order to effect timely and accurate placing of Work and to coordinate, in proper and correct sequence, the Work of such trades.

The size of equipment indicated on the Drawings is based on the dimensions of a particular manufacturer. While other manufacturers may be acceptable, it is the responsibility of the Contractor to determine that the equipment proposed will fit in the space. Fabrication Drawings shall be prepared when required by the Architect/Engineer or Owner to indicate a suitable arrangement.

All equipment shall be installed in a manner to permit access to all surfaces. All valves, motors, drives, filters, and other accessory items shall be installed in a position to allow removal for service without disassembly of another part.

Space Requirements:

- A. Consider space limitations imposed by contiguous Work in location of equipment and material. Do not provide equipment or material which is not suitable in this respect.
- B. Make changes in material and equipment locations of up to five (5) feet, to allow for field conditions prior to actual installation, and as directed by the Architect/Engineer at no additional cost to the Owner.
- C. Contractor shall note that the electrical design and Drawings are based on the equipment scheduled and indicated on the Drawings. Should any equipment be provided requiring changes to the electrical design, the required electrical changes shall be made at no cost to the Owner.

3.2 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Piping may be run exposed in rooms typically without ceilings such as mechanical rooms, janitor's closets, tight against pan soffits in exposed "tee" structures, or storage spaces, but only where necessary. Shutoff and isolation valves shall be easily accessible.

- D. All pipe, conduits, etc., shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All ducts, pipes and conduits run exposed in machinery and equipment rooms shall be installed parallel to the building lines, except that piping shall be sloped to obtain the proper pitch. Piping and ducts run in furred ceilings, etc., shall be similarly installed, except as otherwise shown. All pipe openings shall be kept closed until the systems are closed with final connections.

3.3 FLASHING AND COUNTERFLASHING

- A. All pipes and ducts that pass-through roof and walls shall run so as not to interfere with the structural system and to permit proper application of base and counterflashing.

3.4 CLEANING, STERILIZING AND PIPING

- A) When all work has been finally tested, Contractor shall clean all pipes and exposed work.
- B) All pipes shall be free from all obstructions.
- C) All plated and other finished products shall be thoroughly cleaned and polished.
- D) All piping shall be installed so that it may expand and contract freely without damages to equipment, other work, or injury to piping system. All necessary swing joints, expansion joints, or offsets to protect piping, etc., shall be installed whether indicated or not. Piping shall be graded to allow for system drainage.
- E) All piping shall be installed and sized as indicated on plans and be of equivalent materials to piping as hereinafter specified.
- F) All piping shall be installed with runs arranged parallels or perpendicular to walls and ceilings with symmetrical and equal spacings between parallel pipes. Offsets shall be made using factory fittings, bending of piping shall not be accepted.
- G) Notify Engineer a minimum 72 hours prior to enclosing piping in concealed spaces so that piping may be inspected.

3.5 TESTING

- A) When any piece of mechanical equipment is operable and it is to the advantage of the Contractor to operate the equipment, Contractor may do so, provided that Contractor properly supervises the operation, and has the Owner's written permission to do so. The warranty period shall, however, not commence until such time as the equipment is operated for the beneficial use of the Owner, or date of Substantial Completion, whichever occurs first.

- B) Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, properly adjust, and complete all deficiency list items before final acceptance by the Owner. The date of acceptance and performance certification will be the same date.
- C) Before the Work is accepted, an authorized representative of the manufacturer of the installed materials and/or equipment shall personally inspect the installation and operation of manufacturer's materials and/or equipment to determine that materials and/or equipment are properly installed and in proper operating order. The qualifications of the manufacturer's representative shall be appropriate to the technical requirements of the installation. The qualifications of the manufacturer's representative shall be submitted to the Owner for approval. The decision of the Owner concerning the appropriateness of the manufacturer's representative shall be final. Testing and checking shall be accomplished during the course of the Work where required by Work being concealed, and at the completion of the Work. In addition, the Contractor shall submit to the Architect/Engineer a signed statement from each manufacturer's representative certifying as follows: "I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations."
- D) Check inspections shall include piping, equipment, heating, air conditioning, insulation, ventilating equipment, controls, mechanical equipment and such other items hereinafter specified or specifically designated by the Architect/Engineer.
- E) The Contractor shall execute, at no additional cost to the Owner, any tests required by the Owner or the National Fire Protection Association, ASTM, etc. Standards listed. The Contractor shall provide all equipment, materials and labor for making such tests. The Owner will pay reasonable amounts of fuel and electrical energy costs for system tests. Fuel and electrical energy costs for system adjustment and tests, which follow Substantial Completion by the Owner, will be borne by the Owner.
- F) Notify the Owner's Project Manager and the Architect/Engineer in writing at least seven (7) calendar days prior to each test and prior to other Specification requirements requiring Owner and Architect/Engineer to observe and/or approve tests.
- G) All tests shall have pertinent data logged by the Contractor at the time of testing. Data shall include date, time, personnel performing, observing and inspecting, description of the test and extent of system tested, test conditions, test results, specified results and other pertinent data. Data shall be delivered to the Architect/Engineer as specified under "Requirements for Final Acceptance." The Contractor or Contractor's authorized job superintendent shall legibly sign all Test Log entries.
- H) Refer to Commissioning Specification Sections for additional Start-up, prefunctional and operational checkout, and for functional performance test procedures.

3.6 TESTING AND INSTRUCTION

- A) Piping shall be tested to pressure hereinafter specified. Where pressures are not mentioned, it shall be understood that testing to 1-1/2 times service conditions, before insulation is applied, will be acceptable. All tests shall be held for a minimum of 24 hours before inspection.

- B) Furnish all necessary gauges, pumps, test plugs, and temporary connections and shall test sections of the building as work progresses.
- C) All new hydronic piping shall be tested to 150 PSI for a period of four hours. Domestic water makeup piping shall be tested to 100 PSI for a period of four hours.
- D) All tests shall be made in the presence of the Architect or his representative. Where pipes or connections in new piping are found to leak, they shall be made tight and the tests repeated.
- E) Provide training and instruction for new fan coil units for a period of 4 hours.

3.7 CUTTING AND PATCHING

- A) Cooperate to the fullest extent with all other trades to reduce to a minimum the amount of cutting and patching of other work necessary for this installation. Do not cut or patch the work of other trades but arrange to provide cutting templates in time, or otherwise pay the respective other contractors for changing theirs, to accommodate this work. No cutting into any structural units likely to impair the strength shall be done without the approval of the Architect.

3.8 CLEAN UP

- A) Remove debris, surplus and waste materials, oil, grease or stains resulting from the work performed and leave the premises in a broom clean condition AT THE END OF EACH WORKING DAY. All debris, surplus and waste material shall be removed completely from the job site.

3.9 COMMISSIONING

- A) Contractor shall install all items of equipment as identified in this specification in strict accordance with manufacturer's requirements (whether identified in this specification or not), shop drawings and contract documents. Contractor shall coordinate with Electrical and Temperature Control Contractors to insure a complete installation. Start-up of all equipment shall be by manufacturer authorized representative, unless specific equipment is allowed in writing, by the Engineer, to be started up by the installing Contractor. Start-up services shall be provided for as long a period of time as is necessary to ensure proper operation of the equipment items. The start-up technician shall conduct all operating tests as required to ensure the equipment is operating in accordance with design parameters. Complete testing of all safety and emergency control devices shall be made. The start-up technician shall submit a written report to the engineer (prior to final punch list inspection) containing all test data recorded as required above and a letter certifying that the equipment is operating properly.
- B) Other specific items of commissioning shall be as follows:
 - (1) Visually inspect insulation system to verify that insulation is continuous and vapor barrier is complete. Verify there is no condensation or hot spots, correct as required.

- (2) Thoroughly test all piping systems to ensure no leaks are present. Adjust valves, pressure reducing valves, etc., as required by operating characteristics of the system. Set pressures of domestic water systems and hydronic piping systems.
- (3) Vibration isolation shall be tested by running equipment and checking deflection of spring isolators. Make adjustments as required. No isolator shall be fully compressed.
- (4) Provide written reports for all startup and commissioning tests for Engineer review prior to final punch list inspection.

END OF SECTION 23 0500

SECTION 23 0593 - TESTING AND BALANCING OF AIR & WATER SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish all labor, equipment and services necessary for and incidental to Air and Water Systems Testing and Balancing.
- B. The Contractor shall procure the services of an independent testing and balancing agency. The Testing and Balancing Agency (TBA) specializes in testing and balancing of heating, ventilating, air-moving equipment, air-conditioning system and Hydronic systems. The Contractor shall award the test and balance contract to the above agency as soon as possible after receipt of contract.
- C. Testing and Balancing shall not begin until the systems have been completed and are in full working order.
- D. Shop drawings must be provided to the TBA firm no later than 30 days after the final, approved shop drawings have been returned by the University Representative.
- E. Duct leakage testing shall be the responsibility of the TBA subcontractor.
- F. Fire and smoke damper testing shall be done by the contractor and witnessed by the TBA firm.
- G. The final and complete Test and Balance Report shall be submitted, for approval, not less than two weeks before a final inspection of the Project is requested by the General Contractor. Failure to provide the Report shall be cause to delay the final inspection until the Report is Approved .
- H. Contractor is cautioned that test and Balance Report shall include both Grille counts, and Supply, Return, Outside Air and Exhaust Duct Traverses so that duct leakage can be calculated.

1.2 REFERENCES

- A. AABC – National Standards for Total System Balance.
- B. NEBB – Procedural Standards for Testing, Adjusting, and Balancing.

1.3 SUBMITTALS

- A. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

- B. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for University Representative and for inclusion in operating and maintenance manuals.
- C. Provide reports in soft cover, letter size, binder manuals, complete with index page and indexing TBAs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating, thermostat locations.

1.4 QUALITY ASSURANCE

Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance or NEBB Standards – Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems or Testing Adjusting and Balancing Bureau (TBAB)-National Standards for Environmental Systems Balance.

1.5 QUALIFICATIONS

TBA shall be a Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years experience.

PART 2 - PRODUCTS

2.1 ADJUSTMENT DEVICES

Replacement of adjustable pulleys, additional balancing dampers, additional fan belts, pressure taps and fitting, hydronic balancing valves and any other devices or equipment required to effect proper testing, adjusting and balancing shall be provided shall be provided by the Contractor at no additional cost to the University.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.

8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Beginning of work means acceptance of existing HVAC conditions.

3.2 INSTALLATION TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 5 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets; Adjust total to within plus 5 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 5 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 5 percent of design.

3.3 ADJUSTING – GENERAL

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark setting of valves, dampers, and other adjustment devices allowing setting to be restored. Set and lock memory stops.
- C. After adjustment, take measurement to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- E. At the time of final inspection the TBA agency may be required to recheck, in the presence of the University's Representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the University Representative. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, shall not exceed 10% of the total number TBAulated in the report.

3.4 AIR SYSTEMS PROCEDURE (MINIMUM REQUIREMENTS)

- A. Test and adjust fan RPM to design requirements.

- B. Test and record motor full load nameplate rating and actual ampere draw.
- C. Test and record system static pressures, fan suction and discharge.
- D. Adjust all main supply and return air duct to proper design CFM.
- E. Test and adjust each diffuser, grille and register (new and existing as indicated on drawings). Reading and tests of diffusers, grilles and registers shall include design velocity (FPM) and as adjusted velocity, design CFM and adjusted CFM.
- F. Test and record outside, mixed air and discharge temperatures (D.B. for heating cycle, D.B. and W.B. for cooling cycle).
- G. In coordination with the ATC contractor, set adjustments of automatically operated dampers to operate as specified, indicated and/or noted.
- H. Test and adjust air handling and distribution systems to provide required or design supply, return, outside and exhaust air quantities.
- I. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- J. Measure air quantities at air inlets and outlets.
- K. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- L. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- M. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- N. Provide system schematic with required and actual air quantities recorded at each outlet or inlet
- O. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- P. Adjust outside air automatic dampers, outside air, return air and exhaust dampers for design conditions.
- Q. Measure temperature conditions across air, return air, and exhaust dampers to check leakage.
- R. Where modulating dampers are provided, take measurement and balance at extreme conditions.
- S. Measure and record pressure differentials between designated spaces.

3.5 WATER SYSTEM PROCEDURE (MINIMUM REQUIREMENTS)

- A. Prepare itemized equipment schedules, listing all heating and/or cooling elements and equipment in the systems to be balanced. List in order on equipment schedules, by pump or zone according to the design, all heating or cooling elements all zone balancing valves circuit pump and ending with the last items of equipment or transfer element in the respective zone or circuit. Include on schedule sheet column titles listing the location, type of element or apparatus, design conditions and measured conditions. Prepare individual pump report sheets for each zone or circuit.
- B. Adjust water systems (new and existing as indicated on drawings) to provide required or design quantities.
- C. Use calibrated Venturi tubes, orifices, or other metered fitting and pressure gages to determine flow rates for system balance. Where flow-metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- D. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- E. Effect system balance with automatic control valves fully open to heat transfer elements.
- F. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

3.6 REQUIRED REPORTS TO BE SUBMITTED

The following reports shall be submitted, as a minimum, with a complete Title Page, Summary , and Instrument List. All data and nomenclature shall be provided, as required by AABC and/or NEBB Procedure manuals, for each device tested and balanced.

- 1. Electric Motors.
- 2. Cooling Coils Data.
- 3. Air Moving Equipment.

3.7 COMMISSIONING

- A. Balancing Agency shall coordinate with the Contractor the Commissioning requirements as here-in-before specified.
- B. Contractor is cautioned that the University, thru the University Representative, reserves the right to check and verify any and all points and readings of the Test and

- Balance report. If 15% or more of the points do not agree with the report, then the Contractor shall re-test and re-balance the entire project and submit a complete new Report. If 15% or more of this new Data is independently verified and still does not agree with the Contractor's new Report, then the Owner has the right to hire an Independent Test and Balance Contractor and the Original Contractor shall be held responsible to pay these costs.
- C. All TBA deficiencies shall be corrected when found. Any deficiencies that are (for whatever reason) not corrected immediately shall be shown in the TBA report and listed on a summary sheet in the front of the TBA report. The TBA report must be completed and accepted by the University Representative before the project is accepted and all items on the summary sheet shall become punch list items with dollar values assigned to them.

END OF SECTION 23 0593

SECTION 23 0900 – TEMPERATURE CONTROLS

PART 1: GENERAL

1.1 PRODUCTS

(Not Furnished or Installed but integrated with the Work of this Section)

A. General:

1. Coordination Meeting: The Installer furnishing the DDC network shall meet with the Installer(s) furnishing each of the following products to coordinate details of the interface between these products and the DDC network. The College representative shall be present at this meeting. Each Installer shall provide the College representative and all other Installers with details of the proposed interface including PICS for BACnet equipment, hardware and software identifiers for the interface points, network identifiers, wiring requirements, communication speeds, and required network accessories. The purpose of this meeting shall be to ensure there are no unresolved issues regarding the integration of these products into the DDC network. Submittals for these products shall not be approved prior to the completion of this meeting.

B. Section 233000 - Static power equipment:

1. Variable frequency drives: The variable frequency drive (VFD) vendor shall furnish VFDs with an interface to the control and monitoring points specified in Section 233000. These specified points shall be the minimum acceptable interface to the VFD. The connection to these points shall be by one of the following methods: (a) Hardwired connection such as relay, 0-10VDC, or 4-20mA. (b) BACnet/IP network connection. (c) BACnet over ARCNET network connection. (d) BACnet MS/TP network connection.

C. Communications with Third Party Equipment:

1. Any additional integral control systems included with the products integrated with the work of this section shall be furnished with a BACnet interface for integration into the Direct Digital Control System described in this section.

1.2 RELATED SECTIONS

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents.

1.3 DESCRIPTION

- A. General: The control system shall consist of a high-speed, peer-to-peer network of DDC controllers and a web-based operator interface. Depict each mechanical system and building floor plan by a point-and-click graphic. A web server with a network interface card shall gather data from this system and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface.
- B. The system shall directly control HVAC equipment as specified in Section 230900, Appendix A. Each zone controller shall provide occupied and unoccupied modes of operation by individual zone. Furnish energy conservation features such as optimal start and stop, night setback, request-based logic, and demand level adjustment of setpoints as specified.
- C. Provide for future system expansion to include monitoring of occupant card access, fire alarm, and lighting control systems.
- D. System shall use the native BACnet protocol for communication to the operator workstation or web server and for communication between control modules. Schedules, setpoints, trends, and alarms specified in Section 230900, Appendix A (Sequences of Operation) shall be BACnet objects.

1.4 APPROVED CONTROL SYSTEMS

- A. Use control system hardware and software manufactured and installed by Allerton to interface with existing control systems.

1.5 QUALITY ASSURANCE

- A. Installer and Manufacturer Qualifications
 - 1. Installer shall be an authorized representative of the Control System Manufacturer.

2. Installer shall have successfully completed Control System Manufacturer's control system training. Upon request, Installer shall present record of completed training including course outlines.

1.6 CODES AND STANDARDS

- A. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications. As a minimum, the installation shall comply with current editions in effect 30 days prior to receipt of bids of the following codes:
 1. National Electric Code (NEC)
 2. International Building Code (IBC)
 - a. Section 719 Ducts and Air Transfer Openings
 - b. Section 907 Fire Alarm and Detection Systems
 - c. Section 909 Smoke Control Systems
 - d. Chapter 28 Mechanical
 3. International Mechanical Code (IMC)
 4. ANSI/ASHRAE 135: Data Communication Protocol for Building Automation and Control Systems (BACNET)

1.7 SYSTEM PERFORMANCE

- A. Performance Standards. System shall conform to the following minimum standards over network connections. Systems shall be tested using manufacturer's recommended hardware and software for operator workstation (server and browser for web-based systems).
 1. Graphic Display. A graphic with 20 dynamic points shall display with current data within 10 sec.
 2. Graphic Refresh. A graphic with 20 dynamic points shall update with current data within 8 sec. and shall automatically refresh every 15 sec.
 3. Configuration and Tuning Screens. Screens used for configuring, calibrating, or tuning points, PID loops, and similar control logic shall automatically refresh within 6 sec.
 4. Object Command. Devices shall react to command of a binary object within 2 sec. Devices shall begin reacting to command of an analog object within 2 sec.

5. Alarm Response Time. An object that goes into alarm shall be annunciated at the workstation within 15 sec.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 sec. Select execution times consistent with the mechanical process under control.
7. Performance. Programmable controllers shall be able to completely execute DDC PID control loops at a frequency adjustable down to once per sec. Select execution times consistent with the mechanical process under control.
8. Multiple Alarm Annunciation. Each workstation on the network shall receive alarms within 5 sec of other workstations.
9. Reporting Accuracy. System shall report values with minimum end-to-end accuracy listed in Table 1.
10. Control Stability and Accuracy. Control loops shall maintain measured variable at setpoint within tolerances listed in Table 2.

Table 1
Reporting Accuracy

Measured Variable	Reported Accuracy
Space Temperature	±0.5°C (±1°F)
Ducted Air	±0.5°C (±1°F)
Outside Air	±1.0°C (±2°F)
Dew Point	±1.5°C (±3°F)
Water Temperature	±0.5°C (±1°F)
Delta-T	±0.15°C (±0.25°F)
Relative Humidity	±5% RH
Water Flow	±2% of full scale
Airflow (terminal)	±10% of full scale (see Note 1)
Airflow (measuring stations)	±5% of full scale
Airflow (pressurized spaces)	±3% of full scale
Air Pressure (ducts)	±25 Pa (±0.1 in. w.g.)
Air Pressure (space)	±3 Pa (±0.01 in. w.g.)
Water Pressure	±2% of full scale (see Note 2)

Electrical (A, V, W, Power Factor)	±1% of reading (see Note 3)
Carbon Monoxide (CO)	±5% of reading
Carbon Dioxide (CO ₂)	±50 ppm

Note 1: Accuracy applies to 10% - 100% of scale

Note 2: For both absolute and differential pressure

Note 3: Not including utility-supplied meters

Table 2

Control Stability and Accuracy

Controlled Variable	Control Accuracy	Range of Medium
Air Pressure	±50 Pa (±0.2 in. w.g.)	0-1.5 kPa (0-6 in. w.g.)
	±3 Pa (±0.01 in. w.g.)	-25 to 25 Pa (-0.1 to 0.1 in. w.g.)
Airflow	±10% of full scale	
Space Temperature	±1.0°C (±2.0°F)	
Duct Temperature	±1.5°C (±3°F)	
Humidity	±5% RH	
Fluid Pressure	±10 kPa (±1.5 psi)	MPa (1-150 psi)
	±250 Pa (±1.0 in. w.g.)	0-12.5 kPa (0-50 in. w.g.) differential

1.8 SUBMITTALS

- A. Product Submittal Requirements: Meet requirements on Shop Drawings, Product Data, and Samples. Provide six copies of shop drawings and other submittals on hardware, software, and equipment to be installed or furnished. Begin no work until submittals have been approved for conformity with design intent. Provide drawings as AutoCAD 2013 (or newer) compatible files on magnetic or optical disk (file format: .DWG, .DXF, .VSD, or comparable) and 3 prints of each drawing on 11" x 17" paper. When manufacturer's cutsheets apply to a product series rather than a specific product, clearly indicate applicable data by highlighting or by other means. Clearly reference covered specification and drawing on each submittal. General catalogs shall not be accepted as cutsheets to fulfill submittal requirements. Select and show submittal quantities

appropriate to scope of work. Submittal approval does not relieve Contractor of responsibility to supply sufficient quantities to complete work. Provide submittals within 12 weeks of contract award on the following:

1. Direct Digital Control System Hardware
 - a. Complete bill of materials indicating quantity, manufacturer, model number, and relevant technical data of equipment to be used.
 - b. Manufacturer's description and technical data such as performance curves, product specifications, and installation and maintenance instructions for items listed below and for relevant items not listed below:
 - i. Direct digital controllers (controller panels)
 - ii. Transducers and transmitters
 - iii. Sensors (include accuracy data)
 - iv. Actuators
 - v. Valves
 - vi. Relays and switches
 - vii. Control panels
 - viii. Power supplies
 - ix. Batteries
 - x. Operator interface equipment
 - xi. Wiring
 - c. Wiring diagrams and layouts for each control panel. Show termination numbers.
 - d. Floor plan schematic diagrams indicating field sensor and controller locations.
 - e. Riser diagrams showing control network layout, communication protocol, and wire types.
2. Central System Hardware and Software
 - a. Complete bill of material indicating quantity, manufacturer, model number, and relevant technical data of equipment used.
 - b. Manufacturer's description and technical data such as product specifications and installation and maintenance instructions for items listed below and for relevant items furnished under this contract not listed below:
 - i. Central Processing Unit (CPU) or web server

- ii. Monitors
 - iii. Keyboards
 - iv. Power supplies
 - v. Battery backups
 - vi. Interface equipment between CPU or server and control panels
 - vii. Operating System software
 - viii. Operator interface software
 - ix. Color graphic software
 - x. Third-party software
 - c. Schematic diagrams of control, communication, and power wiring for central system installation. Show interface wiring to control system.
 - d. Network riser diagrams of wiring between central control unit and control panels.
3. Controlled Systems
 - a. Riser diagrams showing control network layout, communication protocol, and wire types.
 - b. Schematic diagram of each controlled system. Label control points with point names. Graphically show locations of control elements.
 - c. Schematic wiring diagram of each controlled system. Label control elements and terminals. Where a control element is also shown on control system schematic, use the same name.
 - d. Instrumentation list (Bill of Materials) for each controlled system. List each control system element in a table. Show element name, type of device, manufacturer, model number, and product data sheet number.
 - e. Complete description of control system operation including sequences of operation. Include and reference schematic diagram of controlled system. List I/O points and software points specified in Section 230900, Article 3.19. Indicate alarmed and trended points.
4. Description of process, report formats, and checklists to be used in Section 230900 Article 3.16 (Control System Demonstration and Acceptance).
5. BACnet Protocol Implementation Conformance Statement (PICS) for each submitted type of controller and operator interface.

B. Schedules

1. Schedule of work provided within one month of contract award, indicating:

- a. Intended sequence of work items
 - b. Start date of each work item
 - c. Duration of each work item
 - d. Planned delivery dates for ordered material and equipment and expected lead times
 - e. Milestones indicating possible restraints on work by other trades or situations
 2. Monthly written status reports indicating work completed and revisions to expected delivery dates. Include updated schedule of work.
- C. Project Record Documents. Submit three copies of record (as-built) documents upon completion of installation for approval prior to final completion. Submittal shall consist of:
1. Project Record Drawings. As-built versions of submittal shop drawings provided as AutoCAD 2013 (or newer) compatible files on magnetic or optical disk (file format: .DWG, .DXF, .VSD, or comparable) and 6 prints of each drawing on 11" x 17" paper.
 2. Testing and Commissioning Reports and Checklists. Completed versions of reports, checklists, and trend logs used to meet requirements of Section 230900 Article 3.16 (Control System Demonstration and Acceptance).
 3. Operation and Maintenance (O&M) Manual. Printed, electronic, or online help documentation of the following:
 - a. As-built versions of submittal product data.
 - b. Names, addresses, and telephone numbers of installing contractors and service representatives for equipment and control systems.
 - c. Operator's manual with procedures for operating control systems: logging on and off, handling alarms, producing point reports, trending data, overriding computer control, and changing setpoints and variables.
 - d. Programming manual or set of manuals with description of programming language and syntax, of statements for algorithms and calculations used, of point database creation and modification, of program creation and modification, and of editor use.
 - e. Engineering, installation, and maintenance manual or set of manuals that explains how to design and install new points, panels, and other hardware; how to perform preventive maintenance and calibration; how to debug hardware problems; and how to repair or replace hardware.

- f. Documentation of programs created using custom programming language including setpoints, tuning parameters, and object database. Electronic copies of programs shall meet this requirement if control logic, setpoints, tuning parameters, and objects can be viewed using furnished programming tools.
 - g. Graphic files, programs, and database on magnetic or optical media.
 - h. List of recommended spare parts with part numbers and suppliers.
 - i. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware including computer equipment and sensors.
 - j. Complete original-issue copies of furnished software, including operating systems, custom programming language, operator workstation or web server software, and graphics software.
 - k. Licenses, guarantees, and warranty documents for equipment and systems.
 - l. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.
- D. Training Materials: Provide course outline and materials for each class at least six weeks before first class. Training shall be furnished via instructor-led sessions, computer-based training, or web-based training. Engineer will modify course outlines and materials if necessary to meet College's needs. Engineer will review and approve course outlines and materials at least three weeks before first class.

1.9 WARRANTY

- A. Warrant work as follows:
- 1. Warrant labor and materials for specified control system free from defects for a period of 12 months after final acceptance. Control system failures during warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to College. Respond during normal business hours within 24 hours of College's warranty service request.
 - 2. Work shall have a single warranty date, even if College receives beneficial use due to early system start-up. If specified work is split into multiple contracts or a

multi-phase contract, each contract or phase shall have a separate warranty start date and period.

3. If Engineer determines that equipment and systems operate satisfactorily at the end of final start-up, testing, and commissioning phase, Engineer will certify in writing that control system operation has been tested and accepted in accordance with the terms of this specification. Date of acceptance shall begin warranty period.
4. Provide updates to operator workstation or web server software, project-specific software, graphic software, database software, and firmware that resolve Contractor-identified software deficiencies at no charge during warranty period. If available, College can purchase in-warranty service agreement to receive upgrades for functional enhancements associated with above-mentioned items. Do not install updates or upgrades without College's written authorization.
5. Exception: Contractor shall not be required to warrant reused devices except those that have been rebuilt or repaired. Installation labor and materials shall be warranted. Demonstrate operable condition of reused devices at time of Engineer's acceptance.

1.10 OWNERSHIP OF PROPRIETARY MATERIAL

- A. Project-specific software and documentation shall become College's property. This includes, but is not limited to:
 1. Graphics
 2. Record drawings
 3. Database
 4. Application programming code
 5. Documentation

PART 2: PRODUCTS

2.1 MATERIALS

- A. Use new products the manufacturer is currently manufacturing and selling for use in new installations. Do not use this installation as a product test site unless explicitly approved

in writing by College. Spare parts shall be available for at least five years after completion of this contract.

2.2 COMMUNICATION

- A. Control products, communication media, connectors, repeaters, hubs, and routers shall comprise a BACnet internetwork. Controller and operator interface communication shall conform to ANSI/ASHRAE Standard 135, BACnet.
- B. Install new wiring and network devices as required to provide a complete and workable control network. Use existing Ethernet backbone for network segments marked "existing" on project drawings.
- C. Each controller shall have a communication port for temporary connection to a laptop computer or other operator interface. Connection shall support memory downloads and other commissioning and troubleshooting operations.
- D. Internetwork operator interface and value passing shall be transparent to internetwork architecture.
 - 1. An operator interface connected to a controller shall allow the operator to interface with each internetwork controller as if directly connected. Controller information such as data, status, and control algorithms shall be viewable and editable from each internetwork controller.
 - 2. Inputs, outputs, and control variables used to integrate control strategies across multiple controllers shall be readable by each controller on the internetwork. Program and test all cross-controller links required to execute control strategies specified in Section 230900, Article 3.19 (Sequence of Operations). An authorized operator shall be able to edit cross-controller links by typing a standard object address or by using a point-and-click interface.
- E. Controllers with real-time clocks shall use the BACnet Time Synchronization service. System shall automatically synchronize system clocks daily from an operator-designated controller via the internetwork. If applicable, system shall automatically adjust for daylight saving and standard time.
- F. System shall be expandable to at least twice the required input and output objects with additional controllers, associated devices, and wiring.

2.3 OPERATOR INTERFACE (EXISTING)

- A. Operator Interface. Web server shall reside on high-speed network with building controllers. Each standard browser connected to server shall be able to access all system information.
- B. Communication. Web server or workstation and controllers shall communicate using BACnet protocol. Web server or workstation and control network backbone shall communicate using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol and BACnet/IP addressing as specified in ANSI/ASHRAE 135, BACnet Annex J.
- C. Hardware – OWS is Existing.
- D. Operator Functions. Operator interface shall allow each authorized operator to execute the following functions as a minimum:
 - 1. Log In and Log Out. System shall require username and password to log in to operator interface.
 - 2. Point-and-click Navigation. Operator interface shall be graphically based and shall allow operators to access graphics for equipment and geographic areas using point-and-click navigation.
 - 3. View and Adjust Equipment Properties. Operators shall be able to view controlled equipment status and to adjust operating parameters such as setpoints, PID gains, on and off controls, and sensor calibration.
 - 4. View and Adjust Operating Schedules. Operators shall be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical schedule display, to select and adjust each schedule and time period, and to simultaneously schedule related equipment. System shall clearly show exception schedules and holidays on the schedule display.
 - 5. View and Respond to Alarms. Operators shall be able to view a list of currently active system alarms, to acknowledge each alarm, and to clear (delete) unneeded alarms.
 - 6. View and Configure Trends. Operators shall be able to view a trend graph of each trended point and to edit graph configuration to display a specific time period or data range. Operator shall be able to create custom trend graphs to display on the same page data from multiple trended points.
 - 7. View and Configure Reports. Operators shall be able to run preconfigured reports, to view report results, and to customize report configuration to show data of interest.

8. Manage Control System Hardware. Operators shall be able to view controller status, to restart (reboot) each controller, and to download new control software to each controller.
9. Manage Operator Access. Typically, only a few operators are authorized to manage operator access. Authorized operators shall be able to view a list of operators with system access and of functions they can perform while logged in. Operators shall be able to add operators, to delete operators, and to edit operator function authorization. Operator shall be able to authorize each operator function separately.

E. System Software.

1. Operating System. Web server shall have an industry-standard professional-grade operating system. Acceptable systems include Microsoft Windows XP Pro, Red Hat Linux, or Sun Solaris.
2. System Graphics. Operator interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using dynamic colors to represent zone temperature relative to zone setpoint.
 - a. Functionality. Graphics shall allow operator to monitor system status, to view a summary of the most important data for each controlled zone or piece of equipment, to use point-and-click navigation between zones or equipment, and to edit setpoints and other specified parameters.
 - b. Animation. Graphics shall be able to animate by displaying different image files for changed object status.
 - c. Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.
 - d. Format. Graphics shall be saved in an industry-standard format such as BMP, JPEG, PNG, or GIF. Web-based system graphics shall be viewable on browsers compatible with World Wide Web Consortium browser standards. Web graphic format shall require no plug-in (such as HTML and JavaScript) or shall only require widely available no-cost plug-ins (such as Active-X and Macromedia Flash).

- F. System Tools. System shall provide the following functionality to authorized operators as an integral part of the operator interface or as stand-alone software programs. If furnished as part of the interface, the tool shall be available from each workstation or web browser interface. If furnished as a stand-alone program, software shall be installable on standard IBM-compatible PCs with no limit on the number of copies that can be installed under the system license.
1. Automatic System Database Configuration. Each workstation or web server shall store on its hard disk a copy of the current system database, including controller firmware and software. Stored database shall be automatically updated with each system configuration or controller firmware or software change.
 2. Controller Memory Download. Operators shall be able to download memory from the system database to each controller.
 3. System Configuration. Operators shall be able to configure the system.
 4. Online Help. Context-sensitive online help for each tool shall assist operators in operating and editing the system.
 5. Security. System shall require a username and password to view, edit, add, or delete data.
 - a. Operator Access. Each username and password combination shall define accessible viewing, editing, adding, and deleting functions in each system application, editor, and object.
 - b. Automatic Log Out. Automatically log out each operator if no keyboard or mouse activity is detected. Operators shall be able to adjust automatic log out delay.
 - c. Encrypted Security Data. Store system security data including operator passwords in an encrypted format. System shall not display operator passwords.
 6. System Diagnostics. System shall automatically monitor controller and I/O point operation. System shall announce controller failure and I/O point locking (manual overriding to a fixed value).
 7. Alarm Processing. System input and status objects shall be configurable to alarm on departing from and on returning to normal state. Operator shall be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Configure and enable alarm points as specified in Section 230900, Article 3.19 (Sequences

- of Operation). Alarms shall be BACnet alarm objects and shall use BACnet alarm services.
8. Alarm Messages. Alarm messages shall use an English language descriptor without acronyms or mnemonics to describe alarm source, location, and nature.
 9. Alarm Reactions. Operator shall be able to configure (by object) actions workstation or web server shall initiate on receipt of each alarm. As a minimum, workstation or web server shall be able to log, print, start programs, display messages, send e-mail, send page, and audibly annunciate.
 10. Alarm Maintenance. Operators shall be able to view system alarms and changes of state chronologically, to acknowledge and delete alarms, and to archive closed alarms to the workstation or web server hard disk from each workstation or web browser interface.
 11. Trend Configuration. Operator shall be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and shall be able to retrieve data for use in spreadsheets and standard database programs. Controller shall sample and store trend data and shall be able to archive data to the hard disk. Configure trends as specified in Section 230900, Article 3.19 (Sequences of Operation). Trends shall be BACnet trend objects.
 12. Object and Property Status and Control. Operator shall be able to view, and to edit if applicable, the status of each system object and property by menu, on graphics, or through custom programs.
 13. Reports and Logs. Operator shall be able to select, to modify, to create, and to print reports and logs. Operator shall be able to store report data in a format accessible by standard spreadsheet and word processing programs.
 14. Standard Reports. Furnish the following standard system reports:
 - a. Objects. System objects and current values filtered by object type, by status (in alarm, locked, normal), by equipment, by geographic location, or by combination of filter criteria.
 - b. Alarm Summary. Current alarms and closed alarms. System shall retain closed alarms for an adjustable period.
 - c. Logs. System shall log the following to a database or text file and shall retain data for an adjustable period:
 - i. Alarm History.
 - ii. Trend Data. Operator shall be able to select trends to be logged.

- iii. Operator Activity. At a minimum, system shall log operator log in and log out, control parameter changes, schedule changes, and alarm acknowledgment and deletion. System shall date and time stamp logged activity.
15. Custom Reports. Operator shall be able to create custom reports that retrieve data, including archived trend data, from the system, that analyze data using common algebraic calculations, and that present results in tabular or graphical format. Reports shall be launched from the operator interface.
16. Graphics Generation. Graphically based tools and documentation shall allow Operator to edit system graphics, to create graphics, and to integrate graphics into the system. Operator shall be able to add analog and binary values, dynamic text, static text, and animation files to a background graphic using a mouse.
17. Graphics Library. Complete library of standard HVAC equipment graphics shall include equipment such as chillers, boilers, air handlers, terminals, fan coils, and unit ventilators. Library shall include standard symbols for other equipment including fans, pumps, coils, valves, piping, dampers, and ductwork. Library graphic file format shall be compatible with graphics generation tools.
18. Custom Application Programming. Operator shall be able to create, edit, debug, and download custom programs. System shall be fully operable while custom programs are edited, compiled, and downloaded. Programming language shall have the following features:
 - a. Language. Language shall be graphically based and shall use function blocks arranged in a logic diagram that clearly shows control logic flow. Function blocks shall directly provide functions listed below, and operators shall be able to create custom or compound function blocks.
 - b. Programming Environment. Tool shall provide a full-screen, cursor-and-mouse-driven programming environment that incorporates word processing features such as cut and paste. Operators shall be able to insert, add, modify, and delete custom programming code, and to copy blocks of code to a file library for reuse in other control programs.
 - c. Independent Program Modules. Operator shall be able to develop independently executing program modules that can disable, enable and exchange data with other program modules.

- d. Debugging and Simulation. Operator shall be able to step through the program observing intermediate values and results. Operator shall be able to adjust input variables to simulate actual operating conditions. Operator shall be able to adjust each step's time increment to observe operation of delays, integrators, and other time-sensitive control logic. Debugger shall provide error messages for syntax and for execution errors.
- e. Conditional Statements. Operator shall be able to program conditional logic using compound Boolean (AND, OR, and NOT) and relational (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
- f. Mathematical Functions. Language shall support floating-point addition, subtraction, multiplication, division, and square root operations, as well as absolute value calculation and programmatic selection of minimum and maximum values from a list of values.
- g. Variables: Operator shall be able to use variable values in program conditional statements and mathematical functions.
 - i. Time Variables. Operator shall be able to use predefined variables to represent time of day, day of the week, month of the year, and date. Other predefined variables or simple control logic shall provide elapsed time in seconds, minutes, hours, and days. Operator shall be able to start, stop, and reset elapsed time variables using the program language.
 - ii. System Variables. Operator shall be able to use predefined variables to represent status and results of Controller Software and shall be able to enable, disable, and change setpoints of Controller Software as described in Controller Software section.
- G. Portable Operator's Terminal. Provide all necessary software to configure an IBM-compatible laptop computer for use as a Portable Operator's Terminal. Operator shall be able to connect configured Terminal to the system network or directly to each controller for programming, setting up, and troubleshooting.
- H. BACnet. Web server or workstation shall have demonstrated interoperability during at least one BMA Interoperability Workshop and shall substantially conform to BACnet Operator Workstation (B-OWS) device profile as specified in ASHRAE/ANSI 135-2001, BACnet Annex L.

2.4 CONTROLLER SOFTWARE

- A. Building and energy management application software shall reside and operate in system controllers. Applications shall be editable through operator workstation, web browser interface, or engineering workstation.
- B. System Security. See Paragraph 2.3.F.5 (Security) and Paragraph 2.3.F.15.c (Operator Activity).
- C. Scheduling. See Paragraph 2.3.D.4 (View and Adjust Operating Schedules). System shall provide the following schedule options as a minimum:
 - 1. Weekly. Provide separate schedules for each day of the week. Each schedule shall be able to include up to 5 occupied periods (5 start-stop pairs or 10 events).
 - 2. Exception. Operator shall be able to designate an exception schedule for each of the next 365 days. After an exception schedule has executed, system shall discard and replace exception schedule with standard schedule for that day of the week.
 - 3. Holiday. Operator shall be able to define 24 special or holiday schedules of varying length on a scheduling calendar that repeats each year.
- D. System Coordination. Operator shall be able to group related equipment based on function and location and to use these groups for scheduling and other applications.
- E. Binary and Analog Alarms. See Paragraph 2.3.F.7 (Alarm Processing).
- F. Alarm Reporting. See Paragraph 2.3.F.9 (Alarm Reactions).
- G. Remote Communication. System shall automatically contact operator workstation or server on receipt of critical alarms. If no network connection is available, system shall use a modem connection.
- H. Demand Limiting.
 - 1. System shall monitor building power consumption from building power meter pulse generator signals or from building feeder line watt transducer or current transformer.
 - 2. When power consumption exceeds adjustable levels, system shall automatically adjust setpoints, de-energize low-priority equipment, and take other programmatic actions to reduce demand as specified in Section 230900, Appendix A (Sequences of Operation). When demand drops below adjustable levels, system shall restore loads as specified.

- I. Maintenance Management. System shall generate maintenance alarms when equipment exceeds adjustable runtime, equipment starts, or performance limits. Configure and enable maintenance alarms as specified in Section 230900, Appendix A (Sequences of Operation).
- J. Sequencing. Application software shall sequence chillers, boilers, and pumps as specified in Section 230900, Appendix A(Sequences of Operation).
- K. PID Control. System shall provide direct- and reverse-acting PID (proportional-integral-derivative) algorithms. Each algorithm shall have anti-windup and selectable controlled variable, setpoint, and PID gains. Each algorithm shall calculate a time-varying analog value that can be used to position an output or to stage a series of outputs.
- L. Staggered Start. System shall stagger controlled equipment restart after power outage. Operator shall be able to adjust equipment restart order and time delay between equipment restarts.
- M. Energy Calculations.
 - 1. System shall accumulate and convert instantaneous power (kW) or flow rates (L/s [gpm]) to energy usage data.
 - 2. System shall calculate a sliding-window average (rolling average). Operator shall be able to adjust window interval to 15 minutes, 30 minutes, or 60 minutes.
- N. Anti-Short Cycling. Binary output objects shall be protected from short cycling by means of adjustable minimum on-time and off-time settings.
- O. On and Off Control with Differential. System shall provide direct- and reverse-acting on and off algorithms with adjustable differential to cycle a binary output based on a controlled variable and setpoint.
- P. Runtime Totalization. System shall provide an algorithm that can totalize runtime for each binary input and output. Operator shall be able to enable runtime alarm based on exceeded adjustable runtime limit. Configure and enable runtime totalization and alarms as specified in Section 230900, Appendix A (Sequence of Operations).

2.5 CONTROLLERS

- A. General. Provide Building Controllers (BC), Advanced Application Controllers (AAC), Application Specific Controllers (ASC), Smart Actuators (SA), and Smart Sensors (SS) as required to achieve performance specified in Section 230900 Article 1.9 (System Performance). Every device in the system which executes control logic and directly

controls HVAC equipment must conform to a standard BACnet Device profile as specified in ANSI/ASHRAE 135, BACnet Annex L. Unless otherwise specified, hardwired actuators and sensors may be used in lieu of BACnet Smart Actuators and Smart Sensors.

B. BACnet.

1. Building Controllers (BCs). Each BC shall conform to BACnet Building Controller (B-BC) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-BC in the BACnet Testing Laboratories (BTL) Product Listing.
2. Advanced Application Controllers (AACs). Each AAC shall conform to BACnet Advanced Application Controller (B-AAC) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-AAC in the BACnet Testing Laboratories (BTL) Product Listing.
3. Application Specific Controllers (ASCs). Each ASC shall conform to BACnet Application Specific Controller (B-ASC) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-ASC in the BACnet Testing Laboratories (BTL) Product Listing.
4. Smart Actuators (SAs). Each SA shall conform to BACnet Smart Actuator (B-SA) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-SA in the BACnet Testing Laboratories (BTL) Product Listing.
5. Smart Sensors (SSs). Each SS shall conform to BACnet Smart Sensor (B-SS) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-SS in the BACnet Testing Laboratories (BTL) Product Listing.
6. BACnet Communication.
 - a. Each BC shall reside on or be connected to a BACnet network using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol and BACnet/IP addressing.
 - b. BACnet routing shall be performed by BCs or other BACnet device routers as necessary to connect BCs to networks of AACs and ASCs.
 - c. Each AAC shall reside on a BACnet network using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol with BACnet/IP addressing, or it shall

reside on a BACnet network using the ARCNET or MS/TP Data Link/Physical layer protocol.

- d. Each ASC shall reside on a BACnet network using the ARCNET or MS/TP Data Link/Physical layer protocol.
- e. Each SA shall reside on a BACnet network using the ARCNET or MS/TP Data Link/Physical layer protocol.
- f. Each SS shall reside on a BACnet network using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol with BACnet/IP addressing, or it shall reside on a BACnet network using ARCNET or MS/TP Data Link/Physical layer protocol.

C. Communication.

1. Service Port. Each controller shall provide a service communication port for connection to a Portable Operator's Terminal. Connection shall be extended to space temperature sensor ports where shown on drawings.
2. Signal Management. BC and ASC operating systems shall manage input and output communication signals to allow distributed controllers to share real and virtual object information and to allow for central monitoring and alarms.
3. Data Sharing. Each BC and AAC shall share data as required with each networked BC and AAC.
4. Stand-Alone Operation. Each piece of equipment specified in Section 23 0900, Article 3.19 (Sequences of Operation) shall be controlled by a single controller to provide stand-alone control in the event of communication failure. All I/O points specified for a piece of equipment shall be integral to its controller. Provide stable and reliable stand-alone control using default values or other method for values normally read over the network.

D. Environment. Controller hardware shall be suitable for anticipated ambient conditions.

1. Controllers used outdoors or in wet ambient conditions shall be mounted in waterproof enclosures and shall be rated for operation at -29°C to 60°C (-20°F to 140°F).
2. Controllers used in conditioned space shall be mounted in dust-protective enclosures and shall be rated for operation at 0°C to 50°C (32°F to 120°F).

E. Keypad. Provide a local keypad and display for each BC and AAC. Operator shall be able to use keypad to view and edit data. Keypad and display shall require password to prevent unauthorized use. If the manufacturer does not normally provide a keypad and

display for each BC and AAC, provide the software and any interface cabling needed to use a laptop computer as a Portable Operator's Terminal for the system.

F. Real-Time Clock. Controllers that perform scheduling shall have a real-time clock.

G. Serviceability.

1. Controllers shall have diagnostic LEDs for power, communication, and processor.
2. Wires shall be connected to a field-removable modular terminal strip or to a termination card connected by a ribbon cable.
3. Each BC and AAC shall continually check its processor and memory circuit status and shall generate an alarm on abnormal operation. System shall continuously check controller network and generate alarm for each controller that fails to respond.

H. Memory.

1. Controller memory shall support operating system, database, and programming requirements.
2. Each BC and AAC shall retain BIOS and application programming for at least 72 hours in the event of power loss.
3. Each ASC and SA shall use nonvolatile memory and shall retain BIOS and application programming in the event of power loss. System shall automatically download dynamic control parameters following power loss.

I. Immunity to Power and Noise. Controllers shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1 m (3 ft).

J. Transformer. ASC power supply shall be fused or current limiting and shall be rated at a minimum of 125% of ASC power consumption.

2.6 INPUT AND OUTPUT INTERFACE

A. General. Hard-wire input and output points to BCs, AACs, ASCs, or SAs.

B. Protection. Shorting an input or output point to itself, to another point, or to ground shall cause no controller damage. Input or output point contact with up to 24 V for any duration shall cause no controller damage.

- C. Binary Inputs. Binary inputs shall monitor the on and off signal from a remote device. Binary inputs shall provide a wetting current of at least 12 mA and shall be protected against contact bounce and noise. Binary inputs shall sense dry contact closure without application of power external to the controller.
- D. Pulse Accumulation Inputs. Pulse accumulation inputs shall conform to binary input requirements and shall accumulate up to 10 pulses per second.
- E. Analog Inputs. Analog inputs shall monitor low-voltage (0-10 Vdc), current (4-20 mA), or resistance (thermistor or RTD) signals. Analog inputs shall be compatible with and field configurable to commonly available sensing devices.
- F. Binary Outputs. Binary outputs shall send an on-or-off signal for on and off control. Building Controller binary outputs shall have three-position (on-off-auto) override switches and status lights. Outputs shall be selectable for normally open or normally closed operation.
- G. Analog Outputs. Analog outputs shall send a modulating 0-10 Vdc or 4-20 mA signal as required to properly control output devices. Each Building Controller analog output shall have a two-position (auto-manual) switch, a manually adjustable potentiometer, and status lights. Analog outputs shall not drift more than 0.4% of range annually.
- H. Tri-State Outputs. Control three-point floating electronic actuators without feedback with tri-state outputs (two coordinated binary outputs). Tri-State outputs may be used to provide analog output control in zone control and terminal unit control applications such as VAV terminal units, duct-mounted heating coils, and zone dampers.
- I. Universal Inputs and Outputs. Inputs and outputs that can be designated as either binary or analog in software shall conform to the provisions of this section that are appropriate for their designated use.

2.7 POWER SUPPLIES AND LINE FILTERING

- A. Power Supplies. Control transformers shall be UL listed. Furnish Class 2 current-limiting type or furnish over-current protection in primary and secondary circuits for Class 2 service in accordance with NEC requirements. Limit connected loads to 80% of rated capacity.
 - 1. DC power supply output shall match output current and voltage requirements. Unit shall be full-wave rectifier type with output ripple of 5.0 mV maximum peak-to-peak. Regulation shall be 1.0% line and load combined, with 100-microsecond

response time for 50% load changes. Unit shall have built-in over-voltage and over-current protection and shall be able to withstand 150% current overload for at least three seconds without trip-out or failure.

- a. Unit shall operate between 0°C and 50°C (32°F and 120°F). EM/RF shall meet FCC Class B and VDE 0871 for Class B and MILSTD 810C for shock and vibration.
- b. Line voltage units shall be UL recognized and CSA listed.

B. Power Line Filtering.

1. Provide internal or external transient voltage and surge suppression for workstations and controllers. Surge protection shall have:
 - b. Dielectric strength of 1000 V minimum
 - c. Response time of 10 nanoseconds or less
 - d. Transverse mode noise attenuation of 65 dB or greater
 - e. Common mode noise attenuation of 150 dB or greater at 40-100 Hz

2.8 AUXILIARY CONTROL DEVICES

A. Electric Damper and Valve Actuators.

1. Stall Protection. Mechanical or electronic stall protection shall prevent actuator damage throughout the actuator's rotation.
2. Spring-return Mechanism. Actuators used for power-failure and safety applications shall have an internal mechanical spring-return mechanism or an uninterruptible power supply (UPS).
3. Signal and Range. Proportional actuators shall accept a 0-10 Vdc or a 0-20 mA control signal and shall have a 2-10 Vdc or 4-20 mA operating range. (Floating motor actuators may be substituted for proportional actuators in terminal unit applications as described in paragraph 2.6H.)
4. Wiring. 24 Vac and 24 Vdc actuators shall operate on Class 2 wiring.
5. Manual Positioning. Operators shall be able to manually position each actuator when the actuator is not powered. Non-spring-return actuators shall have an external manual gear release. Spring-return actuators with more than 7 N·m (60 in.-lb) torque capacity shall have a manual crank.

B. Control Valves.

1. General. Select body and trim materials in accordance with manufacturer's recommendations for design conditions and service shown.
 2. Type. Provide two- or three-way control valves for two-position or modulating service as shown.
 3. Water Valves.
 - a. Valves providing two-position service shall be quick opening. Two-way valves shall have replaceable disc or ball.
 - b. Close-off (Differential) Pressure Rating. Valve actuator and trim shall provide the following minimum close-off pressure ratings.
 - i. Two-way: 150% of total system (pump) head.
 - ii. Three-way: 300% of pressure differential between ports A and B at design flow or 100% of total system (pump) head.
 - c. Ports. Valves providing modulating service shall have equal percentage ports.
 - d. Sizing.
 - i. Two-position service: line size.
 - ii. Two-way modulating service: select pressure drop equal to the greatest of twice the pressure drop through heat exchanger (load), 50% of the pressure difference between supply and return mains, or 35 kPa (5 psi).
 - iii. Three-way modulating service: select pressure drop equal to the smaller of twice the pressure drop through the coil exchanger (load) or 35 kPa (5 psi).
 - e. Fail Position. Water valves shall fail normally open or closed as follows unless otherwise specified.
 - i. Water zone valves: normally open.
 - ii. Heating coils in air handlers: normally open.
 - iii. Chilled water control valves: normally closed.
 - iv. Other applications: as scheduled or as required by sequences of operation.
- C. Binary Temperature Devices.
1. Low-Voltage Space Thermostats. Low-voltage space thermostats shall be 24 V, bimetal-operated, mercury-switch type, with adjustable or fixed anticipation

heater, concealed setpoint adjustment, 13°C-30°C (55°F-85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover.

2. Line-Voltage Space Thermostats. Line-voltage space thermostats shall be bimetal-actuated, open-contact type or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listing for electrical rating, concealed setpoint adjustment, 13°C-30°C (55°F-85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover.
3. Low-Limit Thermostats. Low-limit airstream thermostats shall be UL listed, vapor pressure type. Element shall be at least 6 m (20 ft) long. Element shall sense temperature in each 30 cm (1 ft) section and shall respond to lowest sensed temperature. Low-limit thermostat shall be manual reset only.

D. Temperature Sensors.

1. Type. Temperature sensors shall be Resistance Temperature Device (RTD) or thermistor.
2. Duct Sensors. Duct sensors shall be single point or averaging as shown. Averaging sensors shall be a minimum of 1.5 m (5 ft) in length per 1 m²(10 ft²) of duct cross-section.
3. Immersion Sensors. Provide immersion sensors with a separable stainless steel well. Well pressure rating shall be consistent with system pressure it will be immersed in. Well shall withstand pipe design flow velocities.
4. Space Sensors. Space sensors shall have setpoint adjustment, override switch, display, and communication port as shown.
5. Differential Sensors. Provide matched sensors for differential temperature measurement.

E. Flow Switches. Flow-proving switches shall be paddle (water service only) or differential pressure type (air or water service) as shown. Switches shall be UL listed, SPDT snap-acting, and pilot duty rated (125 VA minimum).

1. Paddle switches shall have adjustable sensitivity and NEMA 1 enclosure unless otherwise specified.
2. Differential pressure switches shall have scale range and differential suitable for intended application and NEMA 1 enclosure unless otherwise specified.

F. Relays.

1. Control Relays. Control relays shall be plug-in type, UL listed, and shall have dust cover and LED "energized" indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
2. Time Delay Relays. Time delay relays shall be solid-state plug-in type, UL listed, and shall have adjustable time delay. Delay shall be adjustable $\pm 100\%$ from setpoint shown. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure for relays not installed in local control panel.

G. Override Timers.

1. Unless implemented in control software, override timers shall be spring-wound line voltage, UL Listed, with contact rating and configuration required by application. Provide 0-6 hour calibrated dial unless otherwise specified. Flush mount timer on local control panel face or where shown.

H. Current Transmitters.

1. AC current transmitters shall be self-powered, combination split-core current transformer type with built-in rectifier and high-gain servo amplifier with 4-20 mA two-wire output. Full-scale unit ranges shall be 10 A, 20 A, 50 A, 100 A, 150 A, and 200 A, with internal zero and span adjustment. Unit accuracy shall be $\pm 1\%$ full-scale at 500 ohm maximum burden.
2. Transmitter shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized.
3. Unit shall be split-core type for clamp-on installation on existing wiring.

I. Current Transformers.

1. AC current transformers shall be UL/CSA recognized and shall be completely encased (except for terminals) in approved plastic material.
2. Transformers shall be available in various current ratios and shall be selected for $\pm 1\%$ accuracy at 5 A full-scale output.
3. Use fixed-core transformers for new wiring installation and split-core transformers for existing wiring installation.

J. Voltage Transmitters.

1. AC voltage transmitters shall be self-powered single-loop (two-wire) type, 4-20 mA output with zero and span adjustment.

2. Adjustable full-scale unit ranges shall be 100-130 Vac, 200-250 Vac, 250-330 Vac, and 400-600 Vac. Unit accuracy shall be $\pm 1\%$ full-scale at 500 ohm maximum burden.
3. Transmitters shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized at 600 Vac rating.

K. Voltage Transformers.

1. AC voltage transformers shall be UL/CSA recognized, 600 Vac rated, and shall have built-in fuse protection.
2. Transformers shall be suitable for ambient temperatures of 4°C - 55°C (40°F - 130°F) and shall provide $\pm 0.5\%$ accuracy at 24 Vac and 5 VA load.
3. Windings (except for terminals) shall be completely enclosed with metal or plastic.

L. Power Monitors.

1. Power monitors shall be three-phase type and shall have three-phase disconnect and shorting switch assembly, UL listed voltage transformers, and UL listed split-core current transformers.
2. Power monitors shall provide selectable output: rate pulse for kWh reading or 4-20 mA for kW reading. Power monitors shall operate with 5 A current inputs and maximum error of $\pm 2\%$ at 1.0 power factor or $\pm 2.5\%$ at 0.5 power factor.

M. Current Switches.

1. Current-operated switches shall be self-powered, solid-state with adjustable trip current. Select switches to match application current and DDC system output requirements.

N. Pressure Transducers.

1. Transducers shall have linear output signal and field-adjustable zero and span.
2. Continuous operating conditions of positive or negative pressure 50% greater than calibrated span shall not damage transducer sensing elements.
3. Water pressure transducer diaphragm shall be stainless steel with minimum proof pressure of 1000 kPa (150 psi). Transducer shall have 4-20 mA output, suitable mounting provisions, and block and bleed valves.
4. Water differential pressure transducer diaphragm shall be stainless steel with minimum proof pressure of 1000 kPa (150 psi). Over-range limit (differential pressure) and maximum static pressure shall be 2000 kPa (300 psi.) Transducer shall have 4-20 mA output, suitable mounting provisions, and 5-valve manifold.

- O. Differential Pressure Switches. Differential pressure switches (air or water service) shall be UL listed, SPDT snap-acting, pilot duty rated (125 VA minimum) and shall have scale range and differential suitable for intended application and NEMA 1 enclosure unless otherwise specified.
- P. Pressure-Electric (PE) Switches. PE switches shall be UL listed, pilot duty rated (125 VA minimum) or motor control rated, metal or neoprene diaphragm actuated, operating pressure rated for 0-175 kPa (0-25 psig), with calibrated scale minimum setpoint range of 14-125 kPa (2-18 psig).
1. Provide one- or two-stage switch action (SPDT, DPST, or DPDT) as required by application.
 2. Switches shall be open type (panel-mounted). Exception: Switches shall be enclosed type for remote installation. Enclosed type shall be NEMA 1 unless otherwise specified.
 3. Each pneumatic signal line to PE switches shall have permanent indicating gauge.
- Q. Local Control Panels.
1. Indoor control panels shall be fully enclosed NEMA 1 construction with hinged door key-lock latch and removable sub-panels. A common key shall open each control panel and sub-panel.
 2. Prewire internal and face-mounted device connections with color-coded stranded conductors tie-wrapped or neatly installed in plastic troughs. Field connection terminals shall be UL listed for 600 V service, individually identified per control and interlock drawings, with adequate clearance for field wiring.
 3. Each local panel shall have a control power source power switch (on-off) with overcurrent protection.

2.9 WIRING AND RACEWAYS

- A. General. Provide copper wiring, plenum cable, and raceways as specified in Section 16050.
- B. Insulated wire shall use copper conductors and shall be UL listed for 90°C (200°F) minimum service.

2.10 FIBER OPTIC CABLE SYSTEM

- A. Optical Cable. Optical cables shall be duplex 900 mm tight-buffer construction designed for intra-building environments. Sheath shall be UL listed OFNP in accordance with NEC Article 770. Optical fiber shall meet the requirements of FDDI, ANSI X3T9.5 PMD for 62.5/125mm.
- B. Connectors. Field terminate optical fibers with ST type connectors. Connectors shall have ceramic ferrules and metal bayonet latching bodies.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Thoroughly examine project plans for control device and equipment locations. Report discrepancies, conflicts, or omissions to College Representative for resolution before starting rough-in work.
- B. Inspect site to verify that equipment can be installed as shown. Report discrepancies, conflicts, or omissions to College Representative for resolution before starting rough-in work.
- C. Examine drawings and specifications for work of others. Report inadequate headroom or space conditions or other discrepancies to College Representative and obtain written instructions for changes necessary to accommodate Section 230900 work with work of others. Contractor shall perform at his expense necessary changes in specified work caused by failure or neglect to report discrepancies.

3.2 PROTECTION

- A. Contractor shall protect against and be liable for damage to work and to material caused by Contractor's work or employees.
- B. Contractor shall be responsible for work and equipment until inspected, tested, and accepted. Protect material not immediately installed. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.3 COORDINATION

- A. Site.

1. Assist in coordinating space conditions to accommodate the work of each trade where work will be installed near or will interfere with work of other trades. If installation without coordination causes interference with work of other trades, Contractor shall correct conditions without extra charge.
 2. Coordinate and schedule work with other work in the same area and with work dependent upon other work to facilitate mutual progress.
- B. Submittals. See Section 230900 Article 1.10 (Submittals).
- C. Test and Balance.
1. Provide Test and Balance Contractor a single set of necessary tools to interface to control system for testing and balancing.
 2. Train Test and Balance Contractor to use control system interface tools.
 3. Provide a qualified technician to assist with testing and balancing the first 20 terminal units.
 4. Test and Balance Contractor shall return tools undamaged and in working condition at completion of testing and balancing.
- D. Coordination with Other Controls. Integrate with and coordinate controls and control devices furnished or installed by others as follows.
1. Communication media and equipment shall be provided as specified in Section 230900 Article 2.2 (Communication).
 2. Each supplier of a controls product shall configure, program, start up, and test that product to meet the sequences of operation described in Section 230900 regardless of where within the contract documents those products are described.
 3. Coordinate and resolve incompatibility issues that arise between control products provided under this section and those provided under other sections or divisions of this specification.
 4. Contractor shall be responsible for integration of control products provided by multiple suppliers regardless of where integration is described within the contract documents.

3.4 GENERAL WORKMANSHIP

- A. Install equipment, piping, and wiring or raceway horizontally, vertically, and parallel to walls wherever possible.

- B. Provide sufficient slack and flexible connections to allow for piping and equipment vibration isolation.
- C. Install equipment in readily accessible locations as defined by National Electrical Code (NEC) Chapter 1 Article 100 Part A.
- D. Verify wiring integrity to ensure continuity and freedom from shorts and ground faults.
- E. Equipment, installation, and wiring shall comply with industry specifications and standards and local codes for performance, reliability, and compatibility.

3.5 FIELD QUALITY CONTROL

- A. Work, materials, and equipment shall comply with rules and regulations of applicable local, state, and federal codes and ordinances as identified in Section 230900 Article 1.8 (Codes and Standards).
- B. Continually monitor field installation for code compliance and workmanship quality.
- C. Contractor shall arrange for work inspection by local or state authorities having jurisdiction over the work.

3.6 WIRING

- A. Control and interlock wiring and installation shall comply with national and local electrical codes and manufacturer's recommendations.
- B. NEC Class 1 (line voltage) wiring shall be UL listed in approved raceway as specified by NEC and Section 16050.
- C. Low-voltage wiring shall meet NEC Class 2 requirements. Subfuse low-voltage power circuits as required to meet Class 2 current limit.
- D. NEC Class 2 (current-limited) wires not in raceway but in concealed and accessible locations such as return air plenums shall be UL listed for the intended application.
- E. Install wiring in raceway where subject to mechanical damage and at levels below 3 m (10ft) in mechanical, electrical, or service rooms.
- F. Install Class 1 and Class 2 wiring in separate raceways. Boxes and panels containing high-voltage wiring and equipment shall not be used for low-voltage wiring except for the purpose of interfacing the two through relays and transformers.
- G. Do not install wiring in raceway containing tubing.
- H. Run exposed Class 2 wiring parallel to a surface or perpendicular to it and tie neatly at 3 m (10 ft) intervals.

- I. Use structural members to support or anchor plenum cables without raceway. Do not use ductwork, electrical raceways, piping, or ceiling suspension systems to support or anchor cables.
- J. Secure raceways with raceway clamps fastened to structure and spaced according to code requirements. Raceways and pull boxes shall not be hung on or attached to ductwork, electrical raceways, piping, or ceiling suspension systems.
- K. Size raceway and select wire size and type in accordance with manufacturer's recommendations and NEC requirements.
- L. Include one pull string in each raceway 2.5 cm (1 in.) or larger.
- M. Use color-coded conductors throughout.
- N. Locate control and status relays in designated enclosures only. Do not install control and status relays in packaged equipment control panel enclosures containing Class 1 starters.
- O. Conceal raceways except within mechanical, electrical, or service rooms. Maintain minimum clearance of 15 cm (6 in.) between raceway and high-temperature equipment such as steam pipes or flues.
- P. Adhere to requirements in Section 16050 where raceway crosses building expansion joints.
- Q. Install insulated bushings on raceway ends and enclosure openings. Seal top ends of vertical raceways.
- R. Terminate control and interlock wiring related to the work of this section. Maintain at the job site updated (as-built) wiring diagrams that identify terminations.
- S. Flexible metal raceways and liquid-tight flexible metal raceways shall not exceed 1 m (3 ft) in length and shall be supported at each end. Do not use flexible metal raceway less than ½ in. electrical trade size. Use liquid-tight flexible metal raceways in areas exposed to moisture including chiller and boiler rooms.
- T. Install raceway rigidly, support adequately, ream at both ends, and leave clean and free of obstructions. Join raceway sections with couplings and according to code. Make terminations in boxes with fittings. Make terminations not in boxes with bushings.

3.7 COMMUNICATION WIRING

- A. Communication wiring shall be low-voltage Class 2 wiring and shall comply with Article 3.7 (Wiring).

- B. Install communication wiring in separate raceways and enclosures from other Class 2 wiring.
- C. During installation do not exceed maximum cable pulling, tension, or bend radius specified by the cable manufacturer.
- D. Verify entire network's integrity following cable installation using appropriate tests for each cable.
- E. Install lightning arrestor according to manufacturer's recommendations between cable and ground where a cable enters or exits a building.
- F. Each run of communication wiring shall be a continuous length without splices when that length is commercially available. Runs longer than commercially available lengths shall have as few splices as possible using commercially available lengths.
- G. Label communication wiring to indicate origination and destination.
- H. Ground coaxial cable according to NEC regulations article on "Communications Circuits, Cable, and Protector Grounding."

3.8 FIBER OPTIC CABLE

- A. During installation do not exceed maximum pulling tensions specified by cable manufacturer. Post-installation residual cable tension shall be within cable manufacturer's specifications.
- B. Install cabling and associated components according to manufacturers' instructions. Do not exceed minimum cable and unjacketed fiber bend radii specified by cable manufacturer.

3.9 INSTALLATION OF SENSORS

- A. Install sensors according to manufacturer's recommendations.
- B. Mount sensors rigidly and adequately for operating environment.
- C. Install room temperature sensors on concealed junction boxes properly supported by wall framing.
- D. Air seal wires attached to sensors in their raceways or in the wall to prevent sensor readings from being affected by air transmitted from other areas.
- E. Use averaging sensors in mixing plenums and hot and cold decks. Install averaging sensors in a serpentine manner vertically across duct. Support each bend with a capillary clip.

- F. Install mixing plenum low-limit sensors in a serpentine manner horizontally across duct. Support each bend with a capillary clip. Provide 3 m (1 ft) of sensing element for each 1 m² (1 ft²) of coil area.
- G. Install pipe-mounted temperature sensors in wells. Install liquid temperature sensors with heat-conducting fluid in thermal wells.
- H. Install outdoor air temperature sensors on north wall at designated location with sun shield.
- I. Differential Air Static Pressure.
 - 1. Supply Duct Static Pressure. Pipe high-pressure tap to duct using a pitot tube. Make pressure tap connections according to manufacturer's recommendations.
 - 2. Return Duct Static Pressure. Pipe high-pressure tap to duct using a pitot tube. Make pressure tap connections according to manufacturer's recommendations.
 - 3. Building Static Pressure. Pipe pressure sensor's low-pressure port to the static pressure port located on the outside of the building through a high-volume accumulator. Pipe high-pressure port to a location behind a thermostat cover.
 - 4. Piping to pressure transducer pressure ports shall contain a capped test port adjacent to transducer.
 - 5. Pressure transducers, except those controlling VAV boxes, shall be located in control panels, not on monitored equipment or on ductwork. Mount transducers in a vibration-free location accessible for service without use of ladders or special equipment.
 - 6. Mount gauge tees adjacent to air and water differential pressure taps. Install shut-off valves before tee for water gauges.
- J. Smoke detectors, freeze stats, high-pressure cut-offs, and other safety switches shall be hard-wired to de-energize equipment as described in the sequence of operation. Switches shall require manual reset. Provide contacts that allow DDC software to monitor safety switch status.

3.10 FLOW SWITCH INSTALLATION

- A. Use correct paddle for pipe diameter.
- B. Adjust flow switch according to manufacturer's instructions.

3.11 ACTUATORS

- A. General. Mount actuators and adapters according to manufacturer's recommendations.
- B. Electric and Electronic Damper Actuators. Mount actuators directly on damper shaft or jackshaft unless shown as a linkage installation. Link actuators according to manufacturer's recommendations.
 - 1. For low-leakage dampers with seals, mount actuator with a minimum 5° travel available for damper seal tightening.
 - 2. To compress seals when spring-return actuators are used on normally closed dampers, power actuator to approximately 5° open position, manually close the damper, then tighten linkage.
 - 3. Check operation of damper-actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.
 - 4. Provide necessary mounting hardware and linkages for actuator installation.
- C. Valve Actuators. Connect actuators to valves with adapters approved by actuator manufacturer.

3.12 WARNING LABELS

- A. Affix permanent warning labels to equipment that can be automatically started by the control system.
 - 1. Labels shall use white lettering (12-point type or larger) on a red background.
 - 2. Warning labels shall read as follows.

<p>CAUTION</p> <p>This equipment is operating under automatic control and may start or stop at any time without warning. Switch disconnect to "Off" position before servicing.</p>
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- B. Affix permanent warning labels to motor starters and control panels that are connected to multiple power sources utilizing separate disconnects.
 - 1. Labels shall use white lettering (12-point type or larger) on a red background.
 - 2. Warning labels shall read as follows.

CAUTION

This equipment is fed from more than one power source with separate disconnects. Disconnect all power sources before servicing.

3.13 IDENTIFICATION OF HARDWARE AND WIRING

- A. Label wiring and cabling, including that within factory-fabricated panels, with control system address or termination number at each end within 5 cm (2 in.) of termination.
- B. Label pneumatic tubing at each end within 5 cm (2 in.) of termination with a descriptive identifier.
- C. Permanently label or code each point of field terminal strips to show instrument or item served.
- D. Label control panels with minimum 1 cm (½ in.) letters on laminated plastic nameplates.
- E. Label each control component with a permanent label. Label plug-in components such that label remains stationary during component replacement.
- F. Label room sensors related to terminal boxes or valves with nameplates.
- G. Manufacturers' nameplates and UL or CSA labels shall be visible and legible after equipment is installed.
- H. Label identifiers shall match record documents.

3.14 PROGRAMMING

- A. Point Naming. Name points as shown on the equipment points list provided with each sequence of operation. See Section 230900, Article 3.19 (Sequences of Operation). Where multiple points with the same name reside in the same controller, each point name may be customized with its associated Program Object number. For example, "Zone Temp 1" for Zone 1, "Zone Temp 2" for Zone 2.
- B. Software Programming. Programming shall provide actions for each possible situation. Graphic- or parameter-based programs shall be documented. Text-based programs shall be modular, structured, and commented to clearly describe each section of the program.
 - 1. Application Programming. Provide application programming that adheres to sequences of operation, Article 3.19, specified in Section 230900. Program documentation or comment statements shall reflect language used in sequences of operation.

2. System Programming. Provide system programming necessary for system operation.
- C. Operator Interface.
1. Standard Graphics. Provide graphics as specified in Section 230900 Article 2.3 Paragraph E.2 (System Graphics). Show on each equipment graphic input and output points and relevant calculated points such as indicated in Section 230900, Article 3.19 (Sequences of Operation). Point information on graphics shall dynamically update.
 2. Install, initialize, start up, and troubleshoot operator interface software and functions (including operating system software, operator interface database, and third-party software installation and integration required for successful operator interface operation) as described in Section 230900.

3.15 CONTROL SYSTEM CHECKOUT AND TESTING

- A. Startup Testing. Complete startup testing to verify operational control system before notifying College of system demonstration. Provide College with schedule for startup testing. College may have representative present during any or all startup testing.
1. Calibrate and prepare for service each instrument, control, and accessory equipment furnished under Section 230900.
 2. Verify that control wiring is properly connected and free of shorts and ground faults. Verify that terminations are tight.
 3. Enable control systems and verify each input device's calibration. Calibrate each device according to manufacturer's recommendations.
 4. Verify that binary output devices such as relays, solenoid valves, two-position actuators and control valves, and magnetic starters, operate properly and that normal positions are correct.
 5. Verify that analog output devices such as I/Ps and actuators are functional, that start and span are correct, and that direction and normal positions are correct. Check control valves and automatic dampers to ensure proper action and closure. Make necessary adjustments to valve stem and damper blade travel.
 6. Prepare a log documenting startup testing of each input and output device, with technician's initials certifying each device has been tested and calibrated.

7. Verify that system operates according to sequences of operation. Simulate and observe each operational mode by overriding and varying inputs and schedules. Tune PID loops and each control routine that requires tuning.
8. Alarms and Interlocks.
 - a. Check each alarm with an appropriate signal at a value that will trip the alarm.
 - b. Trip interlocks using field contacts to check logic and to ensure that actuators fail in the proper direction.
 - c. Test interlock actions by simulating alarm conditions to check initiating value of variable and interlock action.

3.16 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Demonstration. Prior to acceptance, perform the following performance tests to demonstrate system operation and compliance with specification after and in addition to tests specified in Article 3.17 (Control System Checkout and Testing). Provide College Representative with log documenting completion of startup tests.
 1. Engineer will be present to observe and review system demonstration. Notify Engineer at least 10 days before system demonstration begins.
 2. Demonstration shall follow process submitted and approved under Section 230900 Article 1.10 (Submittals). Complete approved checklists and forms for each system as part of system demonstration.
 3. Demonstrate actual field operation of each sequence of operation as specified in Section 230900, Article 3.19. Provide at least two persons equipped with two-way communication. Demonstrate calibration and response of any input and output points requested by College Representative. Provide and operate test equipment required to prove proper system operation.
 4. Demonstrate compliance with Section 230900 Part 1 (System Performance).
 5. Demonstrate compliance with sequences of operation through each operational mode.
 6. Demonstrate complete operation of operator interface.
 7. Demonstrate each of the following.
 - a. DDC loop response. Supply graphical trend data output showing each DDC loop's response to a setpoint change representing an actuator

position change of at least 25% of full range. Trend sampling rate shall be from 10 seconds to 3 minutes, depending on loop speed. Each sample's trend data shall show setpoint, actuator position, and controlled variable values. Engineer will require further tuning of each loop that displays unreasonably under- or over-damped control.

- b. Demand limiting. Supply trend data output showing demand-limiting algorithm action. Trend data shall document action sampled each minute over at least a 30-minute period and shall show building kW, demand-limiting setpoint, and status of setpoints and other affected equipment parameters.
 - c. Building fire alarm system interface.
 - d. Trend logs for each system. Trend data shall indicate setpoints, operating points, valve positions, and other data as specified in the points list provided with each sequence of operation in Section 230900, Article 3.19. Each log shall cover three 48-hour periods and shall have a sample frequency not less than 10 minutes or as specified on its points list. Logs shall be accessible through system's operator interface and shall be retrievable for use in other software programs as specified in Section 230900 Article 2.3 Paragraph E.11 (Trend Configuration).
8. Tests that fail to demonstrate proper system operation shall be repeated after Contractor makes necessary repairs or revisions to hardware or software to successfully complete each test.

B. Acceptance.

1. After tests described in this specification are performed to the satisfaction of the College Representative, the College Representative will accept control system as meeting completion requirements. College Representative may exempt tests from completion requirements that cannot be performed due to circumstances beyond Contractor's control. College Representative will provide written statement of each exempted test. Exempted tests shall be performed as part of warranty.
2. System shall not be accepted until completed demonstration forms and checklists are submitted and approved as required in Section 230900 Article 1.10 (Submittals).

3.17 CLEANING

- A. Each day clean up debris resulting from work. Remove packaging material as soon as its contents have been removed. Collect waste and place in designated location.
- B. On completion of work in each area, clean work debris and equipment. Keep areas free from dust, dirt, and debris.
- C. On completion of work, check equipment furnished under this section for paint damage. Repair damaged factory-finished paint to match adjacent areas. Replace deformed cabinets and enclosures with new material and repaint to match adjacent areas.

3.18 TRAINING

- A. Provide training for a designated staff of College's representatives. Training shall be provided via self-paced training, web-based or computer-based training, classroom training, or a combination of training methods.
- B. Training shall enable students to accomplish the following objectives.
 - 1. Proficiently operate system
 - 2. Understand control system architecture and configuration
 - 3. Understand DDC system components
 - 4. Understand system operation, including DDC system control and optimizing routines (algorithms)
 - 5. Operate workstation and peripherals
 - 6. Log on and off system
 - 7. Access graphics, point reports, and logs
 - 8. Adjust and change system setpoints, time schedules, and holiday schedules
 - 9. Recognize common HVAC system malfunctions by observing system graphics, trend graphs, and other system tools
 - 10. Understand system drawings and Operation and Maintenance manual
 - 11. Understand job layout and location of control components
 - 12. Access data from DDC controllers
 - 13. Operate portable operator's terminals
 - 14. Create and change system graphics
 - 15. Create, delete, and modify alarms, including configuring alarm reactions
 - 16. Create, delete, and modify point trend logs (graphs) and multi-point trend graphs
 - 17. Configure and run reports

18. Add, remove, and modify system's physical points
 19. Create, modify, and delete application programming
 20. Add operator interface stations
 21. Add a new controller to system
 22. Download firmware and advanced applications programming to a controller
 23. Configure and calibrate I/O points
 24. Maintain software and prepare backups
 25. Interface with job-specific, third-party operator software
 26. Add new users and understand password security procedures
- C. Divide presentation of objectives into three sessions (1-13, 14-23, and 24-26).
Participants will attend one or more of sessions, depending on knowledge level required.
1. Day-to-day Operators (objectives 1-13)
 2. Advanced Operators (objectives 1-13 and 14-23)
 3. System Managers and Administrators (objectives 1-13 and 24-26)
- D. Provide course outline and materials according to Section 230900 Article 1.8 (Submittals). Provide one copy of training material per student.
- E. Instructors shall be factory-trained and experienced in presenting this material.
- F. Perform classroom training using a network of working controllers' representative of installed hardware.

APPENDIX A: Sequences of Operation

FAN COIL UNIT

Fan Coil Unit (typical)

The fan coil unit (FCU) is controlled by an application specific DDC controller using electric actuation. The controls will operate on cooling cycle based on control system interlock to indicate whether cooling is required. The FCU is 2 pipe FCU COOLING ONLY. Update all graphics for the new fan coil units and points. The space served by the FCU is controlled in Occupied and Unoccupied modes as follows:

Occupied

The FCU fan operates continuously. The controller monitors the room temperature sensor and modulates the FCU cooling valve to maintain the space temperature at set point.

Unoccupied

The FCU is controlled using the Unoccupied space temperature set point. The FCU fan is off when the space is satisfied. The controller may reset to the Occupied mode for a predetermined time period upon a signal from the control system or manually at the room sensor.

GRAPHICS

Update graphic screens with all new points. Provide trends and alarms for new points.

END OF SECTION – 23 0900

SECTION 23 3000 - MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A) The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.
- B) Refer to General Piping Requirements which shall apply to work in this Section.

1.2 DESCRIPTION OF WORK

- A) The work to be done under this Section includes the furnishing of all labor, tools, materials, equipment, and services necessary for and reasonable incidental to the removal and installation of complete mechanical equipment and piping as shown on plans and herein specified, excepting only work and/or materials indicated as being done and/or furnished under other sections.
- B) Contractor shall refer to other Sections of the Specifications which may be applicable to, or associated with this Section.
- C) Contractor shall disconnect and remove the Mechanical equipment as shown on the drawings.
- D) Contractor shall provide complete installation of piping, equipment, and installation of all field mounted accessories.
- E) Miscellaneous piping.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A) Provide and install structural supports for equipment. These supports must be checked and coordinated by this Section so that they suit the equipment which is to be supported.
- B) Provide all platforms slabs, lintels, and curbs, as directed by this Section, to accommodate the mechanical equipment.

1.4 QUALITY ASSURANCE

- A) These specifications with accompanying drawings, require complete apparatus, fully erected and in successful operating condition. Perform all work in best, most substantial manner.

1.5 SUBMITTALS

- A) Contractor, before beginning work, shall submit dimensional shop drawings for approval of the installation of all piping systems and equipment layouts.
- B) Where the piping installed is of a different configuration and/or routing than that shown on the drawings, Contractor shall assume all responsibility to conform with the

intent of the contract documents. The Engineer shall be advised of any changes and deviations for his approval. The same shall be true for any field modification required because of "on job" construction conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A) Certain items in this specification are listed by manufacturer and/or manufacturer's model number to establish general style, type, character, and quality of the product desired. Similar items manufactured by other than those listed will be considered, providing submittals are made according to Pre-Bid Approval requirements.
- B) Where no manufacturer or model number is given, any product meeting performance or design criteria, or referenced trade association standard may be used and Pre-Bid Approval is not required.

2.2 PIPING AND FITTINGS

- A) Furnish and install all piping related to the mechanical equipment and other miscellaneous piping.
- B) All piping shall be installed parallel and square with building lines and shall be sloped to permit drainage, with suitable provision for drainage at all low points.
- C) Piping shall be arranged to maintain headroom and keep passageways clear and where necessary shall be offset to maintain the required clearance and conform with the structural features of the building. Contractor shall determine in advance of construction locations for all piping sleeves, hangers, etc. No allowance will be made for extra due to inaccurate location of sleeves, piping or equipment.
- D) All piping shall have provisions for expansion and contraction with anchorage at each point shown on the plans and/or as required.
- E) Full length pipe shall be used where possible, short lengths and couplings will not be permitted. After cutting, all pipes shall be reamed out to full bore and before erection, all cutting and foreign matter shall be removed from the inside of pipes. Screwed joints shall be made tight without caulking or the use of lead or paint and no lubricant shall be used except flake granite and cylinder oil paste, or approved pipe compound applied to make threaded pipe.
- F) Pipe sleeves shall be provided for the passage of all pipe through walls, floors and partitions.
- G) Welding fittings shall be Tube Turn, Midwest, or approved equal. Use welding

elbows at all turns in welded piping, except where bent runs are indicated and except that turns and off-setting to a maximum of 15 degrees mitered. At branch connections, use welding tees.

- H) Hydronic piping shall be installed using ASTM A53 Grade B Schedule 40 black steel pipe with welded fittings. Welded elbows shall be factory made long radius.
- I) Water and drain piping 2" and smaller shall be ASTM B88 type "L" hard drawn copper with wrought copper sweat fittings.
- J) Install control valves, sensor wells, sockets, flow meters and DP sensors required by Section 230900. Provide brass nipples for all sensor wells.

2.3 PAINTING AND IDENTIFICATION

- A) Equipment factory fabricated and assembled units shall be furnished with factory applied protective prime coat paint of finished baked enamel. Equipment surfaces damaged during course of construction or shipment shall be refinished by the Contractor.
- B) Detach motor controllers, disconnects, etc., shall be identified with metal or plastic plates with etched letters to completely identify service of electrical equipment.
- C) Major control and sectionalizing valves shall be identified by means of etched brass plates bracketed to valve handle. Contractor shall prepare schedule of such identifying plates for Engineer's approval.
- D) All piping at all equipment shall be stenciled to show the service and direction of flow. Stencils shall be black on a white background with letters one (1") inch high spaced at approximately forty-eight (48") inches apart. Pressure-sensitive pipe markers ANSI Standard A 13.1-1956 may be used in lieu of stenciling.

2.4 WATER TREATMENT

- A. Water treatment chemicals shall be furnished and installed by the University.
- B. This contractor shall completely flush out the systems to remove all oil and film from the inside of the piping.

2.5 VIBRATION ISLOATION SYSTEMS

- A) Work shall include furnishing, installing, and testing all material required and hereinafter called for complete execution of the vibration isolation system. Isolation materials shall not be limited to compressors, converters, air units, pumps, piping, duct work, fans, etc. All motor-connected equipment shall be considered a source of vibration and shall be isolated to prevent vibration and sound transmission. Isolation

equipment, as manufactured by Kinetics, Mason industries or prior approval equal, shall be used. Specific reference to isolation under equipment headings is to provide additional information by which proper selection of the required isolation may be made. Equipment specification data showing physical size, bearing points, weights per point, rotating speeds and sound power levels generated shall be furnished by the respective equipment supplier to the vibration isolation supplier after equipment submittals have been approved.

- B) All mechanical and sound isolation materials specified herein or shown on drawings shall be provided by a single manufacturer to assure singular responsibility for proper selection, application, installation and performance. Substitution for isolation material specified incorporating non-permanent materials, such as cork, rubber, wood pulp, or thermal fiberglass will not be acceptable. Should no specific material be called out for particular use, all mechanical vibration isolation shall be based upon Chapter 46, 1999 A.S.H.R.A.E. Guide-Table 45, "Guide for Selection of Vibration Isolators". Bases, mounts, and hangers furnished shall have a nominal deflection equal to the minimum deflection as shown in this guide and shall be furnished on all motor driven equipment requiring isolation as well as piping and duct connected to same.
- C) To assure stability, the spring element to be a large diameter laterally stable spring with load plate and have a lateral stiffness greater than 0.8 times the rater vertical stiffness and be designed to prove up to 50% overload capacity. Each base mount spring shall have a 1" isolation sound pad of elastomeric material.
- D) Isolation shall be stable during starting and stopping of equipment without any transverse or eccentric movement that could damage or adversely affect the equipment or attachments. Isolation systems for floor or ceiling-mounted equipment shall have a maximum lateral motion under start up and shut down of 3/8". Motion in excess shall be corrected by restrained spring-type mounts. Isolators shall be selected for the lowest operating speed of the equipment isolated and shall be located to produce uniform loading and deflection even when equipment weight is not evenly distributed. Static deflection on grade up to 3/8" shall use nominal 1" deflection springs on isolation pads. Static deflection above grade shall use spring isolators with spring deflection based upon 2007 ASHRAE Handbook Deflection data. The static deflection of the isolation system shall be selected to avoid being in

resonance with the disturbing frequency. All spring isolators shall have neoprene sound damping pads separating isolator from structure.

- E) Submittals shall contain a complete schedule of all equipment to be isolated along with the type of isolator, loading per isolator, static deflection, spring diameters and maximum deflection. Should isolation installed fail to perform satisfactorily in preventing the transmission of vibration, the isolation shall be replaced without cost to owner and properly selected isolators shall be installed.

2.6 FAN COIL UNITS

GENERAL

Furnish and install Horizontal Exposed Cabinet Direct Drive Fan Coil Units where indicated on the plans and in the specifications. Units shall be completely factory assembled, tested and shipped as one piece. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions for each model and size shall be considered maximums. Units shall be ETL listed in compliance with UL/ANSI Standard 1995, and be certified as complying with the latest edition of ARI Standard 440.

Note: provide all options as listed below.

CONSTRUCTION

All unit chassis shall be fabricated of heavy gauge galvanized steel panels able to meet 125 hour salt spray test per ASTM B-117. All exterior panels shall be insulated with 1/2" thick fiberglass insulation with a maximum k value of .24 (BTU • in) / (hr • ft² • °F) and rated for a maximum air velocity of 5000 f.p.m. Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A.

All exposed units shall have exterior panels fabricated of galvanized steel. The fan and filter bottom access panel shall be attached with quarter turn quick open fasteners to allow for easy removal and access for service.

Option: Provide foil-faced insulation in lieu of standard. Foil insulation shall meet or exceed the requirements stated above, and in addition meet ASTM Standards C-665 and C-1136 for biological growth in insulation. Insulation shall be lined with aluminum foil, fiberglass scrim reinforcement, and 30 pound kraft paper laminated together with a flame resistant adhesive. All

exposed edges shall be sealed to prevent any fibers from reaching the air stream.

SOUND

Units shall have published sound power level data tested in accordance with ARI Standard 260-01.

FAN ASSEMBLY

Unit fan shall be a dynamically balanced, forwardly curved; DWDI centrifugal type constructed of 18 gauge zinc coated galvanized steel for corrosion resistance. Motors shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with UL and CSA listed automatic reset thermal overload protection and three separate horsepower taps. Single speed motors are not acceptable.

The fan assembly shall be easily removable for servicing the motor and blower at, or away from the unit. The entire fan assembly shall be able to come out of the unit by removing four nuts per fan and unplugging the motor(s). Plenum unit fan assemblies shall be easily serviced through the filter opening or through the bottom panel.

COILS

All coils shall be ARI 410 certified and tagged with an ARI 410 label.

All cooling coils shall optimize rows and fins per inch to meet the specified capacity. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin. Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.

All coils shall be hydrostatically tested at 450 PSIG air pressure under water, and rated for a maximum of 300 PSIG working pressure at 200°F.

All coils shall be provided with a manual air vent fitting to allow for coil venting.

Provide electric heating coil, sized as indicated in schedule. The heating coil shall be in the reheat position. Provide high temperature limit with automatic reset.

Option: Provide automatic air vents in lieu of manual air vents. Water coils on concealed models shall be field reversible for right or left hand connections.

DRAIN PANS

Primary condensate drain pans shall be single wall; heavy gauge galvanized steel for corrosion resistance, and extend under the entire cooling coil. Drain pans shall be of one-piece construction and be positively sloped for condensate removal.

Drain pans shall be field reversible for right or left hand connections.

The drain pan shall be externally insulated with fire retardant, closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

Option: Provide a single wall primary drain pan constructed entirely of heavy gauge stainless steel for superior corrosion resistance. Stainless steel drain pans shall be externally insulated and meet or exceed the requirements stated above.

Option: Provide a condensate overflow switch in the primary drain pan for condensate overflow.

FILTERS

All plenum and exposed units shall be furnished with a minimum 1" nominal glass fiber throwaway filter. Filters shall be tight fitting to prevent air bypass. Plenum and exposed unit filters shall be easily removable from the bottom of the unit without the need for tools.

Option: Provide unit with 1" pleated filters rated at MERV 13 based on ASHRAE 52.2 - 1999.

ELECTRICAL

Units shall be furnished with single point power connection. Provide an electrical junction box with terminal strip for motor and other electrical terminations. The factory mounted terminal wiring strip consists of a multiple position screw terminal block to facilitate wiring terminations for the electric control valves and thermostats.

PIPING PACKAGES

SECTION 26 0500 – ELECTRICAL GENERAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all labor, tools, materials, fixtures, equipment, accessories, transportation, etc., required for complete electrical lighting and power systems, complete with necessary auxiliaries as indicated on drawings and as hereinafter specified.
- B. The GENERAL CONDITIONS of the Contract and Architectural Drawings and Specifications shall apply to all work under this Section. Separation of Specifications into Sections is for convenience only and is not intended to establish limits of work or liability.
- C. In general, the work shall consist of the following installations:
 - 1. Power wiring and connection to new mechanical equipment.
- D. Prior to submitting quotation for electrical work, Contractor shall visit and examine the job site in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.
- E. It is the intent of these specifications that in all particulars, the materials and workmanship shall conform to the best practice and that the equipment and accessories as furnished and installed shall be complete and ready to operate.
- F. All materials shall be new, except where otherwise indicated, and shall conform with the standards of underwriters' Laboratories in every case where such a standard has been established for the particular type of material in question.
- G. The drawings showing the layout of electrical work indicate approximate location of the outlets, receptacles, panelboards, and other electrical equipment, unless noted otherwise. The runs of feeders and branches are schematic only and are not intended to show the exact routing of conduits. Certain routings are as shown to avoid areas with asbestos materials, and may not allow for deviation. The final determination of the routing shall be governed by structural conditions, other conditions, and other construction. The electrical Contractor shall consult all drawings which may affect the location of any outlet, apparatus, or equipment to avoid possible interference and any reasonable changes in the location of an outlet, apparatus, or equipment, up to the time of rough-in, is reserved by the Architect, and any minor deviations shall be made without additional cost. It shall be the Electrical Contractor's responsibility to see that all equipment such as junction boxes, panelboards, switches, and other apparatus, as may require maintenance from time to time, are made easily accessible. Although the location of the equipment may be shown on the drawings, the construction may disclose the fact that such location

does not make its position readily accessible, in which case the Electrical Contractor shall call the Architect's attention to the condition before advancing the construction to a point where a change in location would require additional cost.

1.2 MEASUREMENTS

Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories necessary. The Contractor shall carefully investigate structural conditions, walls, furring and chase locations and room finishes and shall make actual measurements on the job so that the panelboards, switches, receptacles, lighting fixtures and accessories shall fit.

1.3 LAWS, CODES AND PERMITS

- A. Latest edition of the following listed established standards constitute part of the specification requirements.

National Electrical Code - 2005 (NFPA No. 70)

Applicable State Requirements

Underwriters' Laboratories (UL)

Electrical Testing Laboratories (ETL)

American National Standard Institute (ANSI)

NFPA 101 Life Safety Code – 2007

1.4 JOB CONDITIONS

- A. Accompanying drawings, including plans, details, diagrams, notes, etc., are shown to limit and explain structural conditions, construction requirements, sizes, capacities and method of installation and erection. Structural and other conditions may require certain modifications and adjustments from conditions shown. Such deviations are permissible; however, specific sizes capacities and requirements affecting the satisfactory performance and operation of the installation shall remain unchanged. Make allowance for normal job conditions and interferences.
- B. Ask for details whenever uncertain about method of installation. Lack of details not requested shall not excuse improper installation and correction shall be responsibility of the Contractor.
- C. Schedule and perform all electrical work to avoid delays to the Contractor and other trades.
- D. In addition to the basic work covered under this contract, the Contractor shall plan and schedule the work to permit continuous operation of essential services of

- existing facilities. Planning shall also include scheduling necessary interruptions of electrical service to existing building at times when such interruptions will cause minimum interference with existing routine and services. All such interruptions shall be made only after consultation with the Owner. This is extremely important since included in the work is a relocation and rerouting of and connecting to existing facilities. No additional compensation will be allowed for failure to be so informed. Contractor shall provide temporary power connections as required to execute work as shown on drawings.
- E. It is essential that all adjacent areas of the building be kept in operation at all times, except when specific permission is given to contrary. Before any power or equipment is shut down for disconnecting, tie-ins, or rearranging of services, make arrangements with Owner to do this work at night, or Sunday, or at special time of day or year with length of shutdown agreed upon before work is begun. Contractor to bear any overtime or work costs in this connection.
 - F. All piping, conduits, conductors, and other electrical items in way of construction, shall be rerouted, relocated or otherwise adjusted to work out with such construction or changes shown or specified in any or all of various sections of specifications. Unknown electrical devices that are encountered will be referred immediately to Architect for method of disposition before continuation of work.
 - G. The Contractor shall review the drawings to become familiar with the phasing of construction required for this project.

PART 2 - PRODUCTS AND INSTALLATION

2.1 APPROVALS

- A. Name of manufacturer or catalog numbers are mentioned herein in order to establish a standard as to design and quality. Other products similar in design and of equal quality may be used if submitted to the Architect and approved by him.
- B. Within twenty-one (21) days after award of General Contract, Contractor shall submit complete dimensional shop drawings and descriptive literature covering the following equipment and materials. Written approval thereof must be obtained before ordering or installation.

Disconnect Switches

Conduit and Fittings

Circuit Breakers

Wiring

- C. Comply with requirements of Division 1 Sections regarding submittals, number of copies, and procedures.

2.2 PROTECTION OF FIXTURES, MATERIAL AND EQUIPMENT

- A. Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Owner's property from injury or loss, except as may be caused by agents or employees of the Owner. He shall adequately protect adjacent property as provided by law.
- B. Conduit openings shall be capped or plugged during installation. Fixtures and equipment shall be tightly covered and protected against dirt, moisture, chemical and mechanical injury. At the completion of the work, the fixtures, materials, and equipment shall be thoroughly cleaned and delivered in condition satisfactory to the Architect.

2.3 CUTTING, PATCHING, AND SEALING

- A. All cutting and patching for the work of this Section shall be in accordance with the requirements of the GENERAL CONDITIONS. The Contractor shall perform all necessary cutting and patching required for the installation of work. Where floor or roof is cut or penetrated the structural integrity shall be maintained or restored. Cutting of structural members is prohibited except with prior approval of the Architect.
- B. Penetrations of all walls, floors, and ceilings shall be sealed with a material capable of preventing the passage of flames and gases in accordance with the requirements of the test standard ASTM-E-814 for fire stops. The integrity of the fire rating, as indicated on the architectural drawings, shall be maintained.

2.4 CLEANING UP

- A. This Contractor shall promptly remove from the jobsite all debris, surplus and waste materials, empty crates, and cartons resulting from his work.
- B. This Contractor shall remove all oil, grease or other stains resulting from his work performed in the building or the exterior thereof.

2.5 TESTING AND BALANCING

- A. Make tests which may be required by the Owner or the Engineer in connection with the operation of the electrical system in the building.
- B. All tests shall be made in accordance with the latest standards of the IEEE and the NEC.
- C. The installation shall be tested for performance, grounds, and insulation resistance. "Megger" type instrument shall be used. Circuit continuity tests and operational tests on all equipment furnished and/or connected by him shall be made by the Contractor after such equipment has been installed.

- D. The tests shall be made in the presence of the Engineer or his representative. The Contractor shall notify the Owner or his representative. The Contractor shall notify the Owner and the Architect at least seventy-two (72) hours in advance of tests. The Contractor shall provide all testing equipment and all costs shall be borne by him. Written reports shall be made of all tests. All faults shall be corrected immediately.

2.6 PAINTING

- A. Contractor shall touch-up or refinish all items of electrical equipment furnished with a factory finish coat of paint and which may have been damaged regardless of cause.
- B. All electrical equipment such as switches, panelboards, motor controllers, etc., shall be suitably identified with micarta nameplates.

2.7 GUARANTEE

Upon completion of all tests and acceptance, the Contractor shall furnish the Owner a written guarantee covering all electrical work under this Contract for a period of one (1) year from date of final acceptance. Upon notice from the Owner, Architect or the Consulting Engineer during the Guarantee period, the Contractor shall replace defective materials and correct faults of workmanship and repair any damage caused thereby promptly and free of any charge. Fuses and lamps are excluded from the guarantee.

2.8 CONTRACTOR'S QUALIFICATIONS

The Electrical Contractor, bidding on this portion (Electrical Division) must be licensed to perform such work as required by State and Local laws.

2.9 DIRECTORY CARDS, NAMEPLATES AND EQUIPMENT LABELS

Provide in the directory frame of each panelboard and for each feeder switch or circuit breaker, neatly typed directory cards indicating the specific loads and location of each electrical load.

2.10 SUBSTITUTION

- A. All specified material, equipment, fixtures, etc., entering into the work under this section of contract are subject to the prior approval or disapproval of the Architect. Refer to Division 1 Sections for approval procedures.
- B. Materials, equipment, fixtures, etc., herein named or indicated on drawings establish the type, size, appearance, and quality required of products other manufacturers must meet to be acceptable.
- C. Requests for substitutions must include necessary data to conclusively demonstrate equality in type, size, appearance, quality, etc. Any deviation in the opinion of Engineer may be cause for rejection.

PART 3 - EXECUTION

3.1 COMMISSIONING

- A. Contractor shall install all items of equipment as identified in this specification in strict accordance with manufacturer's requirements (whether identified in this specification or not), shop drawings and contract documents. Contractor shall coordinate with Mechanical and Building Automation and Temperature Control System Contractors to insure a complete installation. Start-up of all equipment shall be by manufacturer authorized representative. Start-up services shall be provided for as long a period of time as is necessary to ensure proper operation of the equipment items. The start-up technician shall conduct all operating tests as required to ensure the equipment is operating in accordance with design parameters. Complete testing of all safety and emergency control devices shall be made. The start-up technician shall submit a written report to the engineer (prior to final punch list inspection) containing all test data recorded as required above and a letter certifying that the equipment is operating properly.
- B. Other specific items of commissioning shall be as follows:
1. Test and balance all new power feeders over 50 amps in accordance with 16010-2.5.
 2. Provide written reports for all tests described above prior to final punch list inspection.

END OF SECTION – 26 0500

SECTION 26 0600 – ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable items of this Section shall apply to all sections of ELECTRICAL.

PART 2 - PRODUCTS AND INSTALLATION

2.1 METHODS OF WIRING

- A. No wire shall be smaller than No. 12 except those for fixture drops and for control circuits of equipment. All wire shall have 600-volt insulation equivalent to type THHN/THWN unless otherwise noted on the drawings.
- B. Conductors shall be continuous from outlet to outlet and no splices shall be made except in outlet or junction boxes.
- C. Homeruns to panelboards may be collected in one or more conduits provided all circuiting is done in accordance with Code requirements and the maximum unbalanced current does not exceed the capacity of the neutral conductors.
- D. Powdered soapstone or approved pulling compound shall be used as a pulling lubricant for all non-lead covered conductors. Use Thomas and Betts Wireslick, Ideal 77 or equal.
- E. All empty conduits installed shall contain a #14 fish wire.
- F. Conduit sizes shall conform to the requirements of the National Electric Code and/or sizes shown on the drawings. Minimize size conduit shall be 1/2".
- G. Vertical penetrations of concrete slabs shall be cored and sealed with fire stop. Size and location of all sleeves are subject to the approval of the structural engineer. Conduits routed below the first-floor slab shall be rigid galvanized conduit, supported using 3/8" stainless steel threaded rods and steel framing, hot-dipped galvanized after fabrication. Supports shall be spaced in accordance with NEC-346-12. Any exposed conduits on exterior of building, shall be heavy wall hot dipped galvanized rigid conduit.
- H. Conduits in metal stud walls, exposed within mechanical and electrical rooms, and above ceilings shall be EMT. Conduits in hollow cmu walls shall be EMT with concrete tight set screw fittings. Conduits in solid, infilled cmu walls shall be Schedule 40 PVC.
- I. All conduit and tubing shall be Armco, Plastic Wire & Cable, Steelduct, Republic, Allied, or approved equal.

- J. Branch circuit conduits feeding outlets in masonry walls shall be concealed in masonry. Where outlet boxes are indicated in bare masonry walls, the box shall be mounted so that two edges of the box or plaster cover will fall in a mortar joint. Where switchboxes will not accommodate the number of conductors required and 4" square or larger boxes are installed, the device covers shall be manufactured by Steel City Manufacturing Co., or Appleton, 1" minimum in depth, with straight rectangular openings for drywall construction. Where grouting is required to fill up improperly cut openings in the masonry, the work will be rejected. Electrical Contractor shall cooperate with the bricklayer to insure a neat and workmanlike job.
- K. Solderless Fixed spring connectors (T & B 10-100, Ideal wrap-cap, or equal) shall be used for all branch circuit wiring and fixture connections on all conductors #10 AWG and smaller. Split bolt or 2 bolt connectors (T & B 6 HPW, O-Z Gedney PMX, or equal) shall be used for connections and splices on all conductors #8 AWG or larger.
- L. Connections to all motors not equipped with a portable cord shall be made with a short piece of flexible metal conduit between rigid conduit system and motor terminal box. Ground bond of separate copper conductor shall be made between motor frame and rigid conduit system. In all outdoor locations, liquid tight flexible metal conduit shall be used.
- M. All recessed fixtures, unless they contain a box approved for THW wire shall be wired with THHN, in three feet (3') maximum of flexible metal conduit from a box at least one foot (1') from the fixture. Not more than two individual or two rows of continuous fixtures shall be connected to any one of these outlet boxes. This box shall be located above the ceiling and shall be accessible by removing fixture. Installation of blank covers on ceilings to provide access to such boxes will not be acceptable.
- N. Splices in all low voltage wiring shall be made at terminal blocks furnished with the equipment. At junction boxes or where other splices are required, these splices shall be soldered.
- O. Other routings than those indicated may not be used without the approval of the Engineer, but Contractor shall make allowance for possible obstructions to routes indicated. Conduits shall be grouped together and run on common hangers parallel to building lines in areas of open ceilings.

2.2 WIRING IN RACEWAYS

- A. Conduit sizes shall conform to requirements of the National Electrical Code and/or sizes shown on drawings.
- B. It is not mandatory that all conduits be routed as shown on the drawings. Other routings facilitating speed and ease of installation may be used, provided the general intent of these specifications is followed and the specific intent of the particular circuit or circuits and the National Electrical Code are not violated; such changes and must

be approved by the Engineer before work is done. Contractor shall make full allowances for possible obstructions to these routes, as no extra charges will be allowed for added lengths that may be necessary.

- C. Conduits shall be installed in a neat appearing manner and shall be rigidly secured in place. The use of wooden plugs in masonry or concrete as a base to fasten raceways will not be permitted. Approved anchors only shall be used for this purpose. Exposed conduits shall be installed with runs arranged parallel or perpendicular to walls and ceilings, with rigid angle turns consisting of symmetrical bends, condulets and junction boxes. Bends and offsets shall be held to a minimum. Conduits shall be kept at least six (6") inches from parallel runs of hot piping flues, or other hot objects.
- D. Conduits shall be cut with a hacksaw; ends must be square, threads cut and cleaned before reaming. Conduits must be securely fastened to all outlet and junction boxes with two locknuts and one bushing of approved make, care being exercised to see that full number of threads project through to permit bushings to butt up tight against the end of the conduit, after which the locknuts shall be screwed tight. Conduit shall be joined by approved conduit couplings and shall have ends butted in all cases where couplings are used. Use three piece threaded electrical unions where standard couplings cannot be used. The use of running threads will not be permitted. Where condulets cannot be joined by standard thread couplings, approved type conduit unions shall be used. Connectors and couplings for electric metallic tubing shall be of the set screw type. Couplings for rigid heavy-wall conduit shall be of the threaded type.
- E. Conduit fittings shall be Crouse-Hinds or Appleton grounding type, or approved equal.
- F. Insulated bushings shall be provided for all conductors #4 and larger.
- G. No wire shall be pulled in until the conduit system is complete and plastering dried. This does not include the white finish coat of plaster.
- H. During Construction, all outlet boxes and conduit stub-ins shall be suitably protected against the entrance of foreign material.

2.3 BOXES AND FITTINGS

- A. Boxes and fittings shall conform to requirements of Article 370 of the N.E.C.
- B. Junction and pull boxes required by field conditions shall be installed whether indicated on drawings or not.
- C. The location of outlets not specifically dimensioned on the drawings should be considered as approximate only. The Contractor shall study the general plans with relation to the spaces surrounding each outlet in order that his work fit the work of

- others so that when fixtures or other fittings are installed, they will be symmetrically located according to design requirements.
- D. Use only galvanized outlet and junction boxes, conduit fittings, covers, and supports for interior wiring and cast fittings and boxes with gasketed covers for exterior wiring. The Contractor shall provide all necessary structural supports for boxes and cabinets. Kindorf or Unistrut channels shall be used where applicable.
 - E. Boxes for concealed outlets shall be 4" square by 1-1/2" deep, or larger, with raised device covers as required, except that 2-3/4" deep switch boxes may be used where only one conduit enters a box.
 - F. Boxes for concealed ceiling outlets shall be 4" octagonal by 1-1/2" deep, or larger. Boxes in plaster ceilings shall have plaster covers. Fixture outlet boxes shall be equipped with fixture studs secured to the boxes.
 - G. Outlet boxes for exposed work shall be 4" square by 1-1/2" deep, or larger. Boxes shall have Appleton 1/2" deep surface metal covers to accommodate the devices indicated, or approved equal.
 - H. In walls or ceilings of concrete, tile or other non-combustible material, boxes and fittings shall be so installed that the front edge of the box or fitting will not set back of the finished surface more than 1/4". In walls or ceilings constructed of wood or other combustible material, outlet boxes and fittings shall be set flush with the finished surface.
 - I. If a fixture, canopy, or pan is used as an outlet box cover, any combustible wall or ceiling finish between the edge of the canopy and the outlet box shall be covered with non-combustible material.
 - J. Fixture studs shall be installed in all fixture outlets. In each case, the maximum permissible number of conductors shall be reduced by one.
 - K. Appropriate galvanized blank covers, subject to approval of the Engineer, shall be installed over outlet or junction boxes which do not house a device. Multiple devices shall be installed in one-piece multi-gang box with one-piece multi-gang cover plates. On surface mounted switch and receptacle outlets, provide raised covers to permit mounting devices without additional device plates.
 - L. For junction and pull boxes, 14 gauge or thicker sheet metal. Attach covers by means of 1/4" X 20 round head machine screws. In damp locations, provide rubber or neoprene gaskets.
 - M. Attention is called to National Electrical Code, Article 370, Paragraph 370-16, Sub-paragraph (a) and (b) relative to allowable number of conductors in outlet boxes. Contractor shall make provisions to prevent overcrowding outlet and junction boxes regardless of number of conductors shown on the drawings at the outlets. There shall be no deviations from Code requirements on this subject.

2.4 CONDUCTORS

- A. All conductors shall be copper, and no wire shall be less than #12 AWG except as otherwise noted herein and or indicated on drawings.
- B. All conductors, except as herein noted and/or as indicated on drawings, shall have 600-volt insulation type THHN/THWN. Wiring through channels of continuous surface or suspended fluorescent fixtures shall be Type RHH, or THHN.
- C. Recessed fluorescent fixtures shall be fed with type THHN, or RHH conductors and recessed incandescent fixtures shall be fed with Type THHN conductors.
- D. Conductors #8 and larger shall be stranded. Feeders shall be of the size and type indicated on drawings.
- E. Type MC cable shall not be used.

2.5 GROUNDING

- A. Grounding shall conform to the requirements of Article 250 of the N.E.C.
- B. Contractor shall provide grounding as indicated on drawings, or as required by the modifications to the distribution system.
- C. A grounding conductor shall be provided in all conduits. The grounding conductor shall be green insulated, with a minimum size of #12 AWG, or as indicated on the drawings or per NEC-250. Grounding conductors routed entirely in soil as part of the ground loop shall be bare copper. The grounding conductor connecting the electrical service to the ground system shall be green insulated copper.
- D. Bond jumpers shall be used around concentric or eccentric knockouts on service equipment.
- E. Grounding pole of each polarized receptacle shall be bonded to its outlet box with copper wire and machine or self-tapping screw.

2.6 EQUIPMENT SUPPORTS

All electrical switches, panels, appurtenances, etc., shall be rigidly supported on Unistrut or equal steel framing which shall be securely fastened to walls, floors, ceilings, etc., as required. Details of framing must be submitted to Engineer for approval before installation.

2.7 MOUNTING HEIGHTS

- A. If not otherwise indicated in the drawings, mounting heights to centerline of outlets shall be as follows:

- B. Receptacles - 18" above finished floor except above counter where indicated, or as directed by Owner.
- C. Light Switches - 48" above finished floor.
- D. Panelboard - Not more than 6'-0" from topmost operating handle to floor.
- E. Bracket Fixtures - 8'-0" above floor, or where mounted above exterior door, mirror, medicine cabinet, at a height just sufficient to clear the swing of the door or medicine cabinet.
- F. The above mounting heights may be adjusted as required to permit bottom or top of plate to align with mortar joints in unfinished masonry walls, provided joints are not raked. Where joints are raked, adjust height as required to ensure that center of outlet box will be in center of a masonry unit.

2.8 SAFETY SWITCHES

- A. Safety switches shall be of the visible blade, heavy duty knife switch type. They shall be of the fused or unfused type as required. Fused switches shall have positive pressure fuse clips. Switches shall be fully interlocked with provision to neutralize the interlock by a screwdriver while under load without interrupting the circuit. Switches shall be complete with insulated base and pressure or solderless lugs. All switches shall be horsepower rated, capable of breaking stalled-rotor motor current at these ratings. Outdoor locations shall have NEMA Type 3R enclosures, indoor locations shall have NEMA 1 enclosures. Safety switches by the cooling tower shall be constructed of 304 or 316 stainless steel.
- B. Switches shall have provision for padlocking in the "ON" or "OFF" positions. Safety switches, as indicated on plans, shall be Siemens, General Electric, Cutler-Hammer, or Square D.

2.9 FUSES

- A. Fuses utilized shall provide type 2 "no damage" as defined by IEC 947. All fuses shall have a minimum interrupting rating of 200,000 A. Fuses protecting transformers shall be Class J or RK5 time delay. Fuses protecting motor loads shall be Class J or RK1 current limiting. Provide one set of spare fuses for each load protected. Fuses shall be manufactured by Ferraz-Shawmut, Cooper Bussman, or approved equal.

2.10 TERMINATIONS

All termination lugs shall be rated 75 degrees C or higher, and shall be compatible with number and size of wires to be terminated.

END OF SECTION – 26 0600

SECTION 26 5000 - ELECTRICAL EQUIPMENT CONNECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable items of all other ELECTRICAL SECTIONS shall apply to this Section.
- B. All Drawings and General Provisions of the Contract, including General Conditions, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION

3.1 MECHANICAL EQUIPMENT

- A. All power wiring associated with the MECHANICAL SECTION of these Specifications shall be done by this Contractor.
- B. Mechanical Contractor will furnish and set all motors.
- C. Overload elements in all starters shall be selected according to actual motor nameplate full load current. Responsibility for this coordination shall lie with the Contractor who has furnished the particular starter. Starters, for motors furnished by Mechanical Contractor, shall be furnished by Mechanical Contractor.
- D. All manual starting switches shall be furnished and installed by the Contractor.
- E. All disconnect switches shall be furnished and installed as indicated and as required by the Electrical Contractor.
- F. Refer to MECHANICAL SECTION and to MECHANICAL PLANS for any additional electrical work required.
- G. Should the Mechanical or any other Contractor desire to use equipment requiring larger motors than those indicated on the drawings or equipment requiring more elaborate controls than the equipment described in these specifications, the responsible contractor shall reimburse the Contractor for any extra materials or labor which the latter must furnish.

END OF SECTION – 26 0500

BUILDING B SHOP FAN COIL INSTALLATION NUNEZ COMMUNITY COLLEGE CHALMETTE, LOUISIANA PROJECT # 40015-HVAC-COILS

BUILDING B

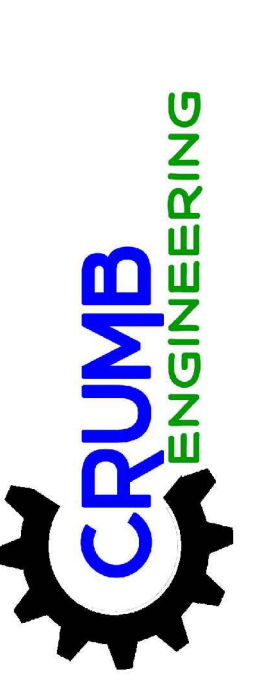


CONSTRUCTION NOTES:

1. SHUTDOWNS MUST BE SCHEDULED WITH COLLEGE REPRESENTATIVE A MINIMUM OF ONE MONTH BEFORE PERFORMING WORK. CONTRACTOR SHALL INCLUDE WEEKEND AND OVERTIME WORK IN BID AS REQUIRED.
2. CONTRACTOR SHALL VISIT SITE AND INCLUDE ALL OFFSETS REQUIRED FOR CONDITIONS SHOWN ON DRAWINGS.
3. ALL SURPLUS MATERIAL SHALL BE HAULED OFF SITE AND LEGALLY DISPOSED OF.
4. PROVIDE 1" HOSE GATE VALVES AT ALL LOW POINTS FOR SYSTEM DRAIN. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS.
5. ALL WORK MUST BE SUBSTANTIALLY COMPLETE BY JUNE 30, 2024.
6. REMOVE ALL UNUSED PIPING, CONTROLS, CONDUIT, WIRE AND SUPPORTS.
7. REMOVE AND REINSTALL CEILING TILES AS REQUIRED FOR ALL WORK ABOVE EXISTING CEILINGS.
8. CONTRACTOR SHALL VERIFY EXISTING PIPING LOCATIONS AND PROPOSED PIPE ROUTING IN FIELD.
9. ALTERNATE #1 SHALL CONSIST OF ALL WORK RELATED WITH FAN COIL UNITS; FCU - 5, 11 AND 12-17.

Table of Contents:

T1.0	TITLE SHEET
ME1.0	PARTIAL FLOOR PLAN - MECHANICAL & ELECTRICAL
ME1.1	PARTIAL FLOOR PLAN - MECHANICAL & ELECTRICAL
ME2.0	SCHEDULES & DETAILS



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SHOP FAN COIL INSTALLATION
BUILDING B
Nunez Community College

3710 PARIS ROAD
Chalmette, Louisiana 70043



These drawings are the property of the designer and are not to be reproduced in whole or in part. They are only to be used for the project and site specifically identified herein.

Scales stated herein are valid on the original drawings only. Contractor shall carefully review all dimensions and conditions shown and report to the engineer any errors, inconsistencies, or omissions discovered.

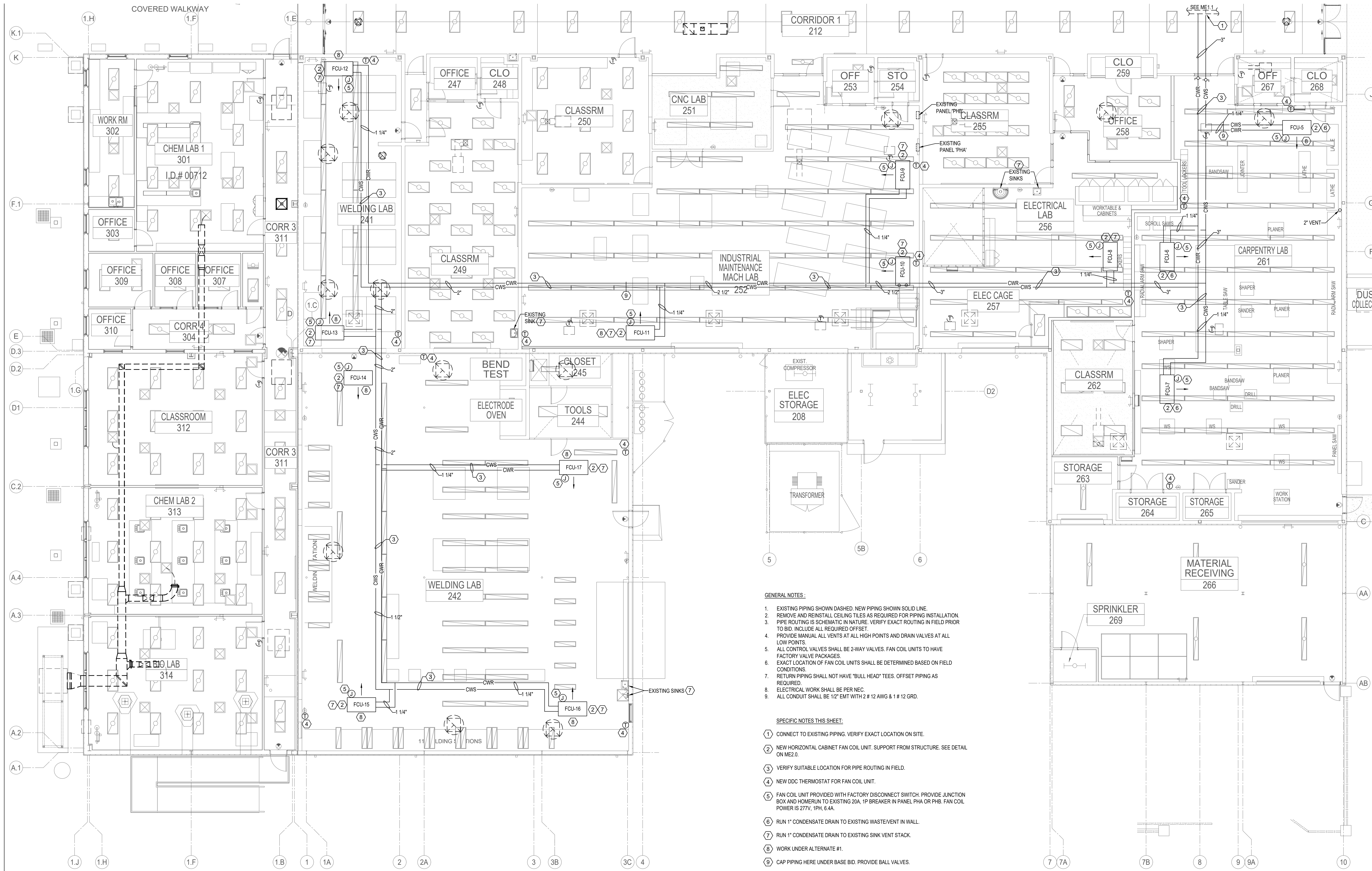
These plans were prepared in this office under our personal supervision, and to the best of our knowledge comply with state and local codes. We will generally administer construction.

revisions

date	01 FEB 2024
BID SET	

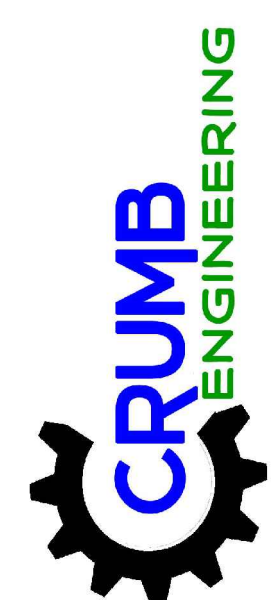
sheet

T1.0



PARTIAL FLOOR PLAN - MECHANICAL & ELECTRICAL
 SCALE: 1/8" = 1'-0"

- GENERAL NOTES:**
- EXISTING PIPING SHOWN DASHED. NEW PIPING SHOWN SOLID LINE.
 - REMOVE AND REINSTALL CEILING TILES AS REQUIRED FOR PIPING INSTALLATION. PIPE ROUTING IS SCHEMATIC IN NATURE. VERIFY EXACT ROUTING IN FIELD PRIOR TO BID. INCLUDE ALL REQUIRED OFFSET.
 - PROVIDE MANUAL ALL VENTS AT ALL HIGH POINTS AND DRAIN VALVES AT ALL LOW POINTS.
 - ALL CONTROL VALVES SHALL BE 2-WAY VALVES. FAN COIL UNITS TO HAVE FACTORY VALVE PACKAGES.
 - EXACT LOCATION OF FAN COIL UNITS SHALL BE DETERMINED BASED ON FIELD CONDITIONS.
 - RETURN PIPING SHALL NOT HAVE "BULL HEAD" TEES. OFFSET PIPING AS REQUIRED.
 - ELECTRICAL WORK SHALL BE PER NEC.
 - ALL CONDUIT SHALL BE 1/2" EMT WITH 2 # 12 AWG & 1 # 12 GRD.
- SPECIFIC NOTES THIS SHEET:**
- CONNECT TO EXISTING PIPING. VERIFY EXACT LOCATION ON SITE.
 - NEW HORIZONTAL CABINET FAN COIL UNIT. SUPPORT FROM STRUCTURE. SEE DETAIL ON ME2.0.
 - VERIFY SUITABLE LOCATION FOR PIPE ROUTING IN FIELD.
 - NEW DDC THERMOSTAT FOR FAN COIL UNIT.
 - FAN COIL UNIT PROVIDED WITH FACTORY DISCONNECT SWITCH. PROVIDE JUNCTION BOX AND HOMERUN TO EXISTING 20A, 1P BREAKER IN PANEL PHA OR PHB. FAN COIL POWER IS 277V, 1PH, 3-W.
 - RUN 1" CONDENSATE DRAIN TO EXISTING WASTEVENT IN WALL.
 - RUN 1" CONDENSATE DRAIN TO EXISTING SINK VENT STACK.
 - WORK UNDER ALTERNATE #1.
 - CAP PIPING HERE UNDER BASE BID. PROVIDE BALL VALVES.



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**SHOP FAN COIL INSTALLATION
 BUILDING B
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3710 PARIS ROAD
 Chalmette, Louisiana 70043



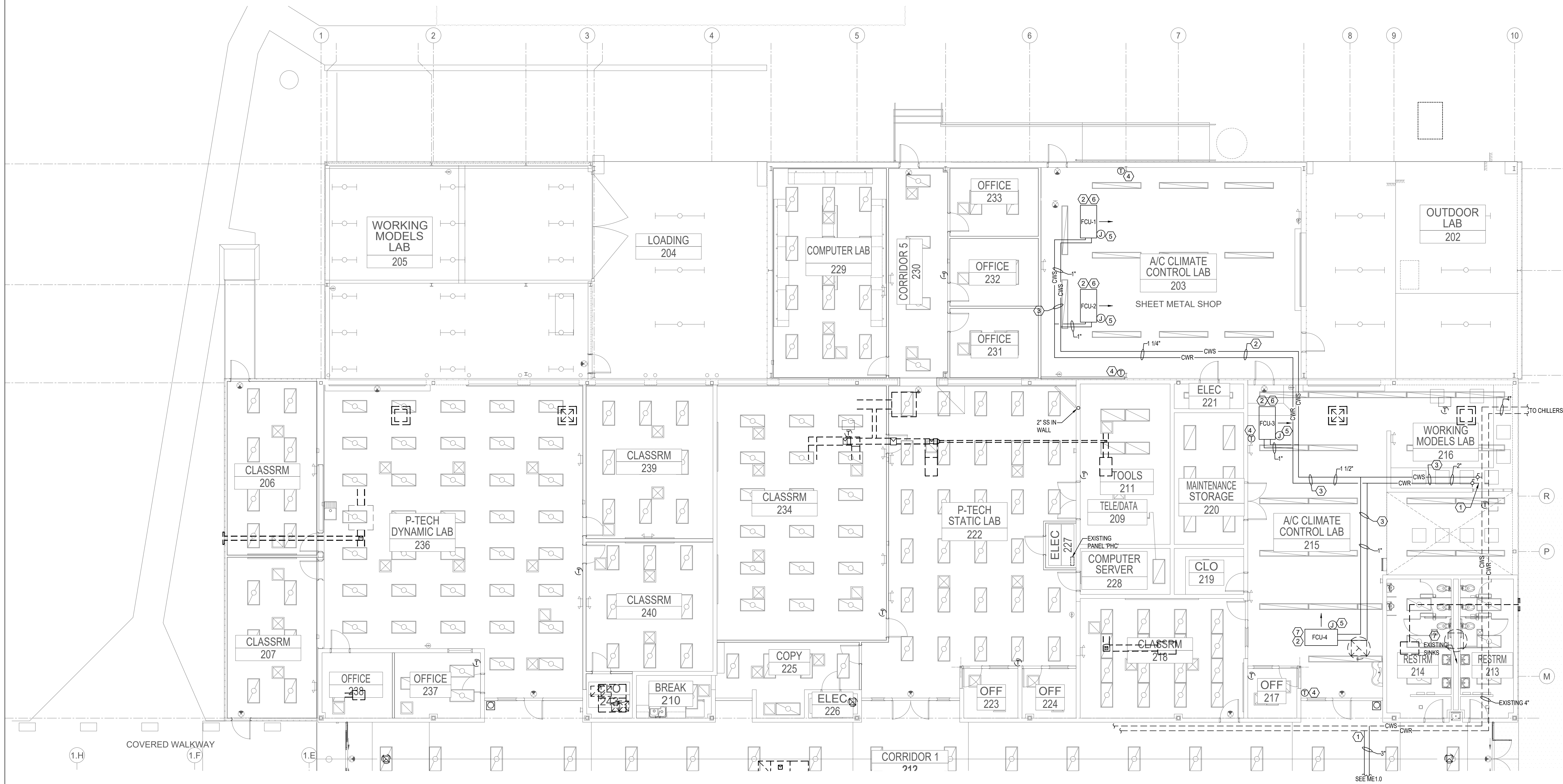
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NO.	REVISIONS	DATE

date
 BID SET 01 FEB 2024

sheet

ME1.0



PARTIAL FLOOR PLAN - MECHANICAL & ELECTRICAL

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. EXISTING PIPING SHOWN DASHED. NEW PIPING SHOWN SOLID LINE.
2. REMOVE AND REINSTALL CEILING TILES AS REQUIRED FOR PIPING INSTALLATION.
3. PIPE ROUTING IS SCHEMATIC IN NATURE. VERIFY EXACT ROUTING IN FIELD PRIOR TO BID. INCLUDE ALL REQUIRED OFFSET.
4. PROVIDE MANUAL ALL VENTS AT ALL HIGH POINTS AND DRAIN VALVES AT ALL LOW POINTS.
5. ALL CONTROL VALVES SHALL BE 2-WAY VALVES. FAN COIL UNITS TO HAVE FACTORY VALVE PACKAGES.
6. EXACT LOCATION OF FAN COIL UNITS SHALL BE DETERMINED BASED ON FIELD CONDITIONS.
7. RETURN PIPING SHALL NOT HAVE "BULL HEAD" TEES. OFFSET PIPING AS REQUIRED.
8. ELECTRICAL WORK SHALL BE PER NEC.
9. ALL CONDUIT SHALL BE 1/2" EMT WITH 2 # 12 AWG & 1 # 12 GRD.

SPECIFIC NOTES THIS SHEET:

- ① CONNECT TO EXISTING PIPING. VERIFY EXACT LOCATION ON SITE.
- ② NEW HORIZONTAL CABINET FAN COIL UNIT. SUPPORT FROM STRUCTURE. SEE DETAIL ON ME2.0.
- ③ VERIFY SUITABLE LOCATION FOR PIPE ROUTING IN FIELD.
- ④ NEW DDC THERMOSTAT FOR FAN COIL UNIT.
- ⑤ FAN COIL UNIT PROVIDED WITH FACTORY DISCONNECT SWITCH. PROVIDE JUNCTION BOX AND HOMERUN TO EXISTING 20A, 1P BREAKER IN PANEL PHC. FAN COIL POWER IS 277V, 1PH, 6.4A.
- ⑥ RUN 1" CONDENSATE DRAIN TO EXISTING WASTE IN WALL.
- ⑦ RUN 1" CONDENSATE DRAIN TO EXISTING VENT STACK IN TOILET ROOM.

**SHOP FAN COIL INSTALLATION
BUILDING B
Nunez Community College**

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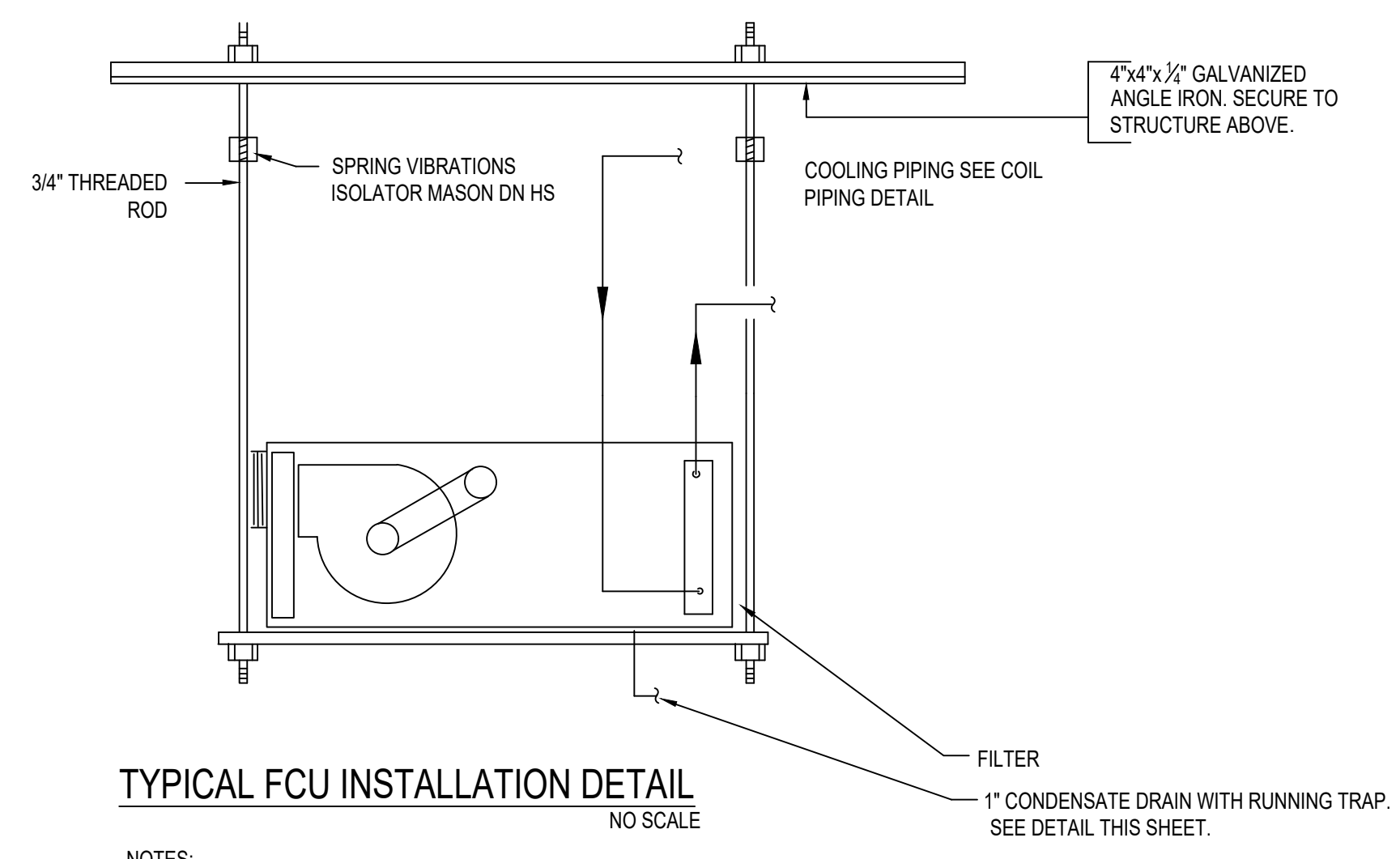
ME1.1

MECHANICAL		LEGEND	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CWS	CHILLED WATER SUPPLY	O/A	OUTSIDE AIR
CWR	CHILLED WATER RETURN	R/A	RETURN AIR
HWR	HEATING WATER RETURN	RAG	RETURN AIR GRILLE
HWS	HEATING WATER SUPPLY	S/A	SUPPLY AIR
CFM	CUBIC FEET PER MINUTE	(TYP)	TYPICAL
CLG	CEILING	VTR	VENT THRU ROOF
CONN.	CONNECTION	(H)	HUMIDITY SENSOR
DN	DOWN	(T)	TEMPERATURE SENSOR
E/A	EXHAUST AIR	VD	VOLUME DAMPER
EF	EXHAUST FAN	~~~~~	FLEX DUCT
F.D.	1 1/2 HOUR UL 555 FIRE DAMPER	↑	AIR CHAMBER (10" HIGH PIPE)

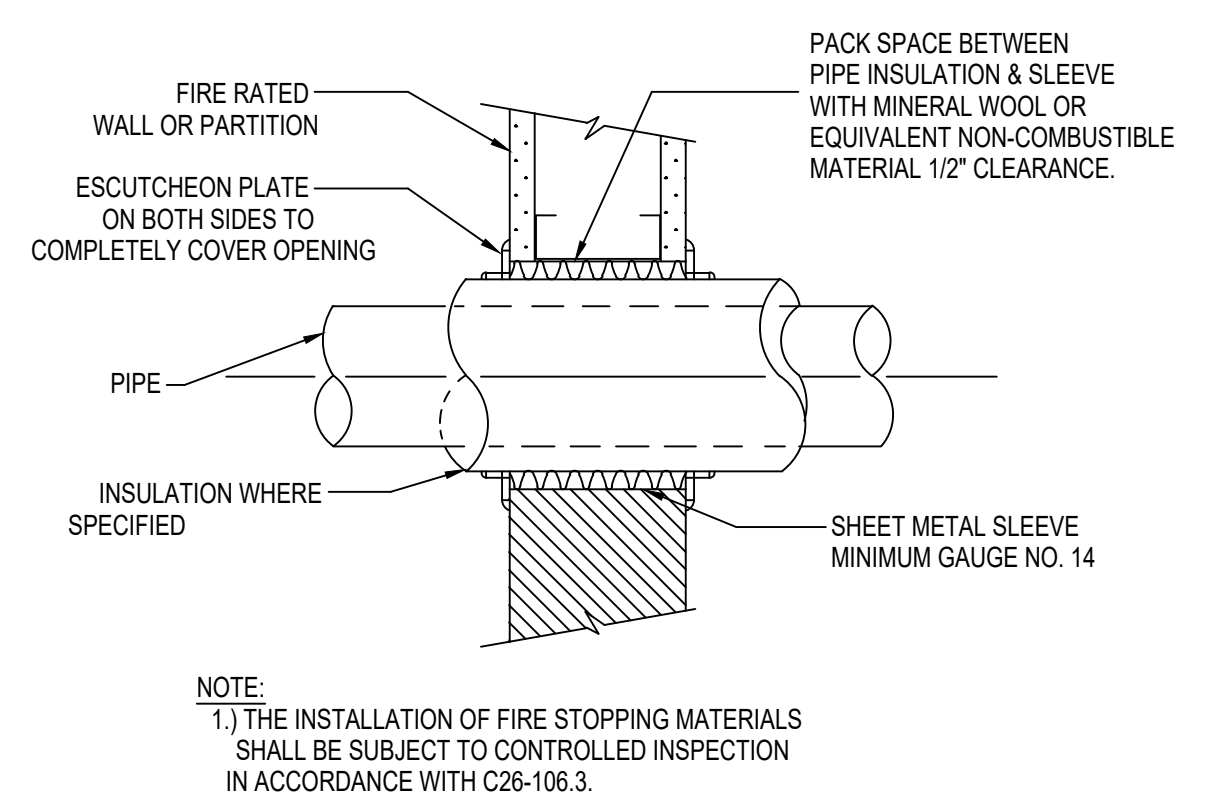
ELECTRICAL		LEGEND	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
□	DISCONNECT SWITCH W/VISIBLE BLADES		
⊠	STARTER/ DISCONNECT		
Ⓜ	JUNCTION BOX		
Ⓜ	ELECT. MOTOR W/APPROVED DISC. SWITCH		
—	CONDUIT / WIRING		
[F]	SPEAKER STROBE TO MATCH EXISTING DEVICES		
\$3	3-WAY LIGHT SWITCH		
\$0	OCCUPANCY SENSOR LIGHT SWITCH		

FAN COIL UNIT SCHEDULE																					
Mark	Model	Size	Fan Speed	Airflow	ESP	Primary Total Capacity	Primary Sensible Capacity	Primary Entering Dry Bulb	Primary Entering Wet Bulb	Primary Leaving Dry Bulb	Primary Leaving Wet Bulb	Primary Entering Fluid Temperature	Primary Leaving Fluid Temperature	Primary Fluid Flow Rate	Primary Fluid Pressure Drop	Coil Rows	E-Heat Voltage	E-Heat KW	Motor Type	Motor VPH	Motor FLA
FCU-1,2,3,4,5	HXY	14	C	1200 CFM	0.20 in WC	37247 BTUH	30814 BTUH	75.0 F	62.0 F	51.6 F	51.0 F	44.0 F	54.0 F	7.385 GPM	4.0 Ft WC	6	120/1/60	None	EC Motor; 3 Speed Potentiometer Field	115/1/60	12.8
FCU-6,7,8,9,10,11,12,13,14,15,16,17	HXY	16	C	1600 CFM	0.20 in WC	49506 BTUH	40935 BTUH	75.0 F	62.0 F	51.7 F	51.0 F	44.0 F	54.0 F	9.816 GPM	6.8 Ft WC	6	120/1/60	None	EC Motor; 3 Speed Potentiometer Field	115/1/60	12.8

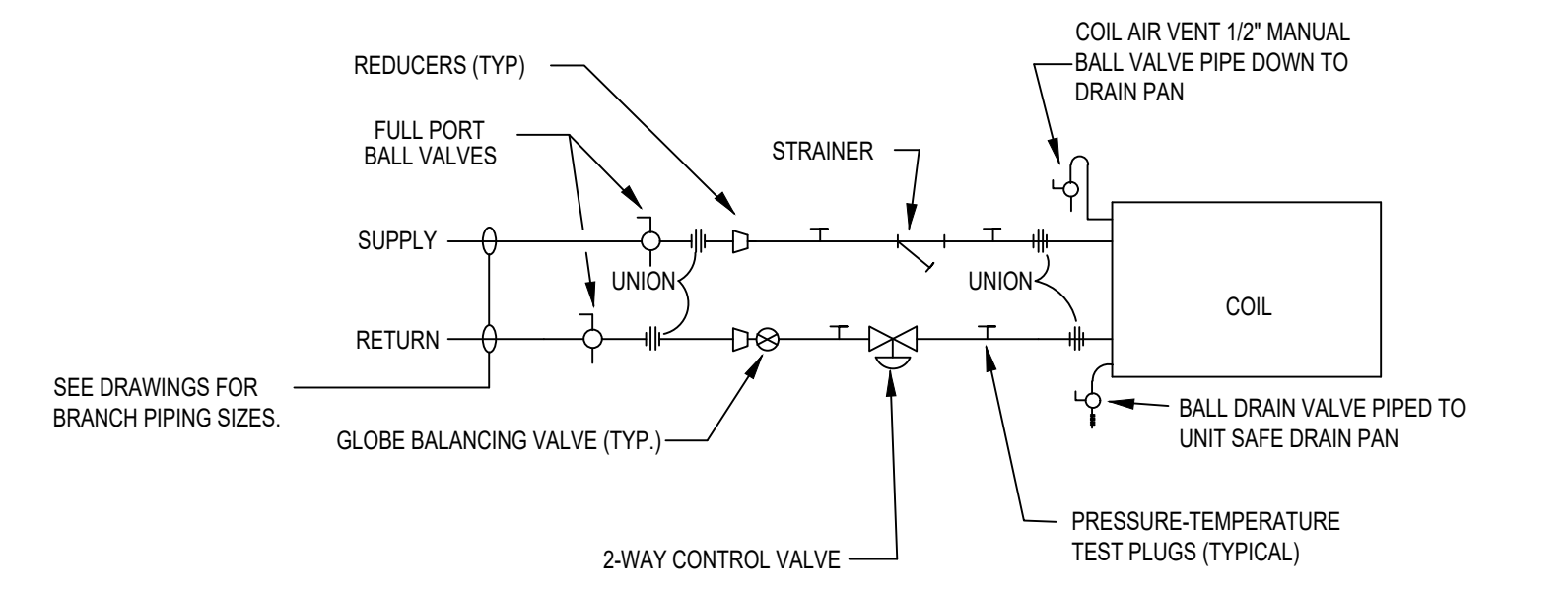
Notes:
1. Basis of design is IEC. Approved equals, Williams, Trane, Carrier.
2. All motors to be prmium efficient.
3. Provide MERV 11 filters.



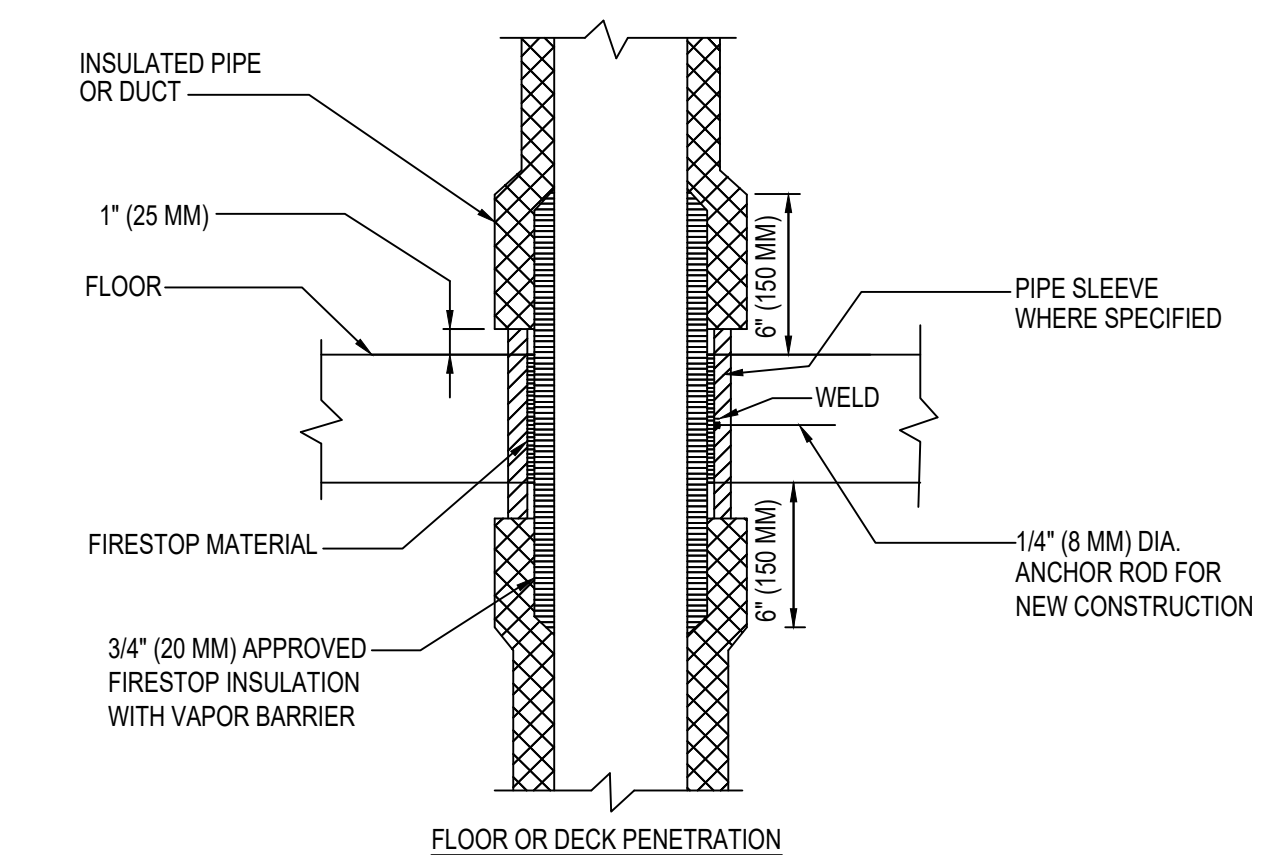
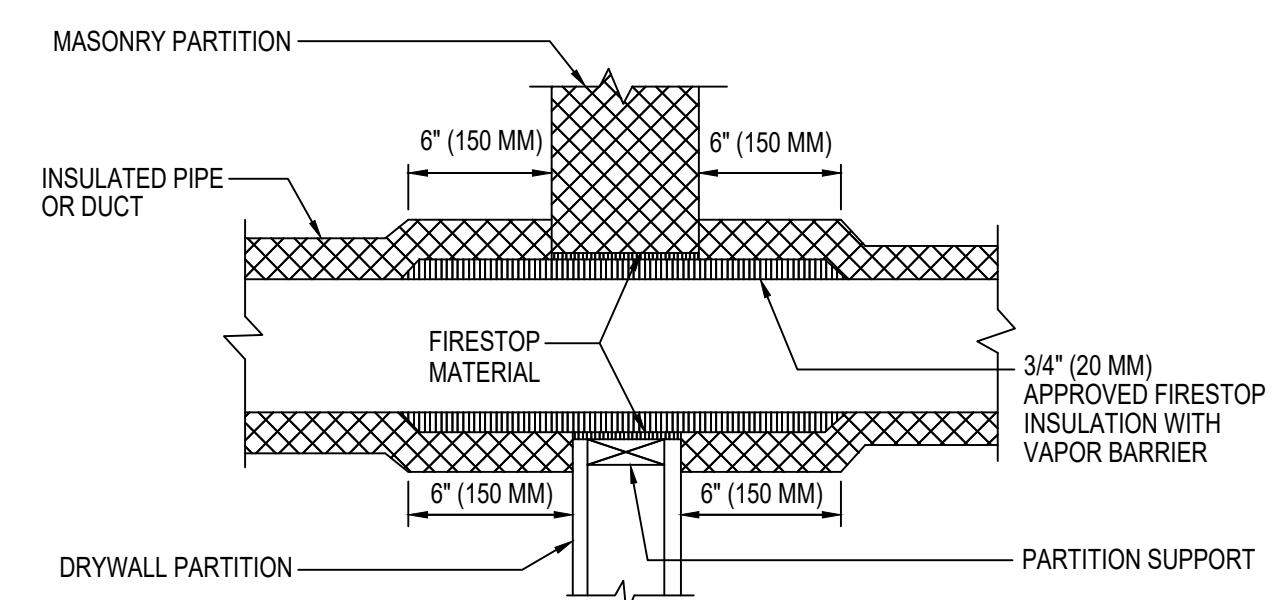
- NOTES:
- ALLOW MINIMUM 3'-0" CLEARANCE TO PIPING AND ACCESS DOORS.
 - PROVIDE CONDENSATE SAFETY SWITCH.



NOTE:
1. THE INSTALLATION OF FIRE STOPPING MATERIALS SHALL BE SUBJECT TO CONTROLLED INSPECTION IN ACCORDANCE WITH C26-106.3.

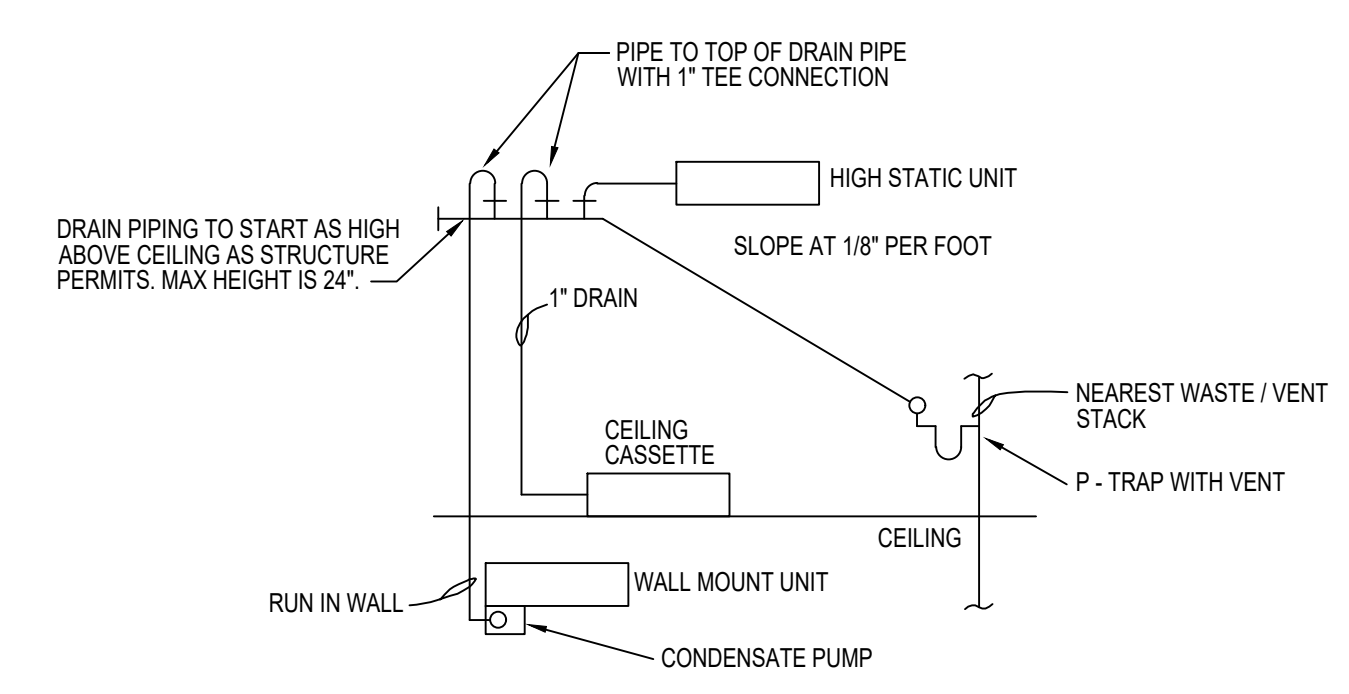


COOLING COIL PIPING DIAGRAM
NO SCALE



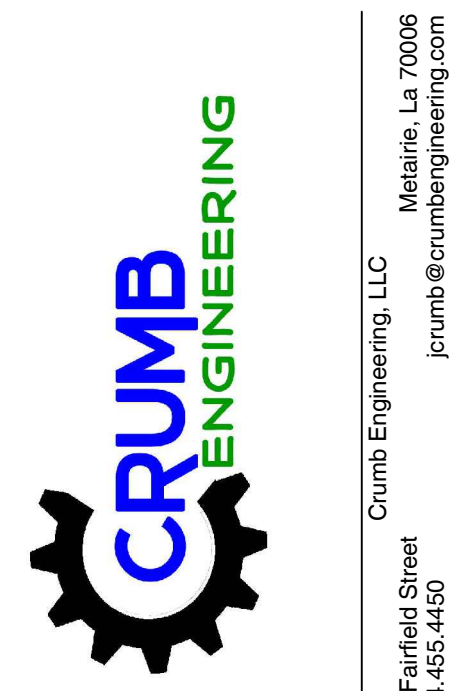
PIPE/DUCT PENETRATION OF FIRE/SMOKE BARRIERS
NO SCALE

- NOTE:
- APPLICABLE TO PENETRATIONS OF ALL FIRE RATED MEMBRANES, IN ACCORDANCE WITH NFPA 101. REFER TO SPECIFICATIONS SECTION 078413, FIRE STOPPING SYSTEMS.



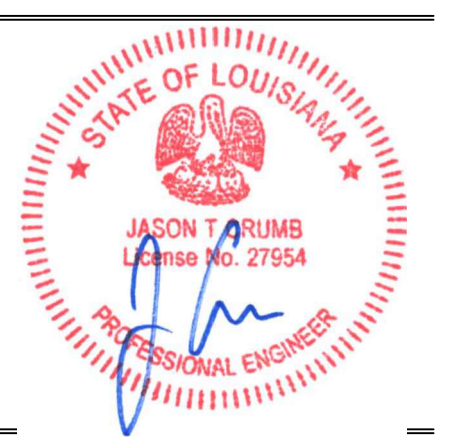
- NOTES:
- MINIMUM 1" DRAIN SIZE PER UNIT.
 - INSULATE ALL CONDENSATE DRAIN LINES.
 - PIPE SIZING: 1-4 AC UNITS 1" PIPE
5-10 AC UNITS 1 1/4" PIPE
11-20 AC UNITS 1 1/2" PIPE
21-50 AC UNITS 2" PIPE
 - PROVIDE SAFETY INTERLOCK TO SHUT UNITS OFF IN EVENT OF CONDENSATE PUMP FAILURES.

CONDENSATE DRAIN PIPING
NO SCALE



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ME2.0