PROJECT MANUAL

FOR

WILMINGTON CAMPUS RENOVATIONS

RED CLAY CONSOLIDATED SCHOOL DISTRICT — **OWNER**
1502 SPRUCE AVENUE
WILMINGTON, DELAWARE 19805

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1621 N. LINCOLN STREET
WILMINGTON, DELAWARE 19806
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LARSEN & LANDIS — **STRUCTURAL ENGINEERS**
1615 SUNSET LANE
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BID PACK A

ABHA PROJECT NUMBER: 1219

DATE: APRIL 15, 2013

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SECTION 000115 LIST OF DRAWINGS

DRWG NO.	DRAWING NAME	BID PACKS	ISSUE DATE	LATEST REV. DATE
G-001	COVER SHEET, LOCATION PLAN & DRAWING LIST	A	04-15-13	
S-101	STRUCTURAL NOTES, ROOF FRAMING PLAN & DETAILS	A	04-15-13	
A-101	FIRST FLOOR PLAN	A	04-15-13	
A-102	SECOND FLOOR PLAN	A	04-15-13	
A-103	THIRD FLOOR PLAN	A	04-15-13	
A-104	ROOF PLAN	A	04-15-13	
A-411	TOILET ROOM PLANS & ELEVATIONS	A	04-15-13	
A-412	TOILET ROOM FINISH PLANS, ELEVATIONS & FINISH SCHEDULE	A	04-15-13	
A-421	ELEVATOR PLANS, ELEVATIONS & DETAILS	A	04-15-13	
A-431	POOLPACK & LOBBY DETAILS	A	04-15-13	
FP-100	FIRE PROTECTION RISER DIAGRAM/SECTIONS/DETAILS	A	04-15-13	
FP-111	FIRST FLOOR FIRE PROTECTION	A	04-15-13	
FP-112	MEZZANINE FIRE PROTECTION	A	04-15-13	
FP-113	ALTERNATES FIRE PROTECTION	A	04-15-13	
FP/P-101	FIRST FLOOR FIRE PROTECTION & PLUMBING	A	04-15-13	
FP/P-102	SECOND FLOOR FIRE PROTECTION & PLUMBING	A	04-15-13	
FP/P-103	THIRD FLOOR FIRE PROTECTION & PLUMBING		04-15-13	
P-100	PLUMBING & FIRE PROTECITON LEGEND/SYMBOLS NOTES & SCHEDULES	A	04-15-13	
P-101	FIRST & SECOND FLOOR DEMOLITION & NEW WORK PLUMBING	A	04-15-13	
M-100	MECHANICAL LEGEND & ABBREVIATIONS	A	04-15-13	
M-101	MECHANICAL SCHEDULES & DETAILS	A	04-15-13	
MP-100	SECOND FLOOR, THIRD FLOOR & PENTHOUSE PLANS DEMOLITION & NEW WORK MECHANICAL / PLUMBING	A	04-15-13	
		A	04-15-13	
E-101	FIRST & SECOND FLOOR ELECTRICAL	A	04-15-13	
E-102	THIRD FLOOR & PENTHOUSE ELECTRICAL	A	04-15-13	
E-201	FIRST FLOOR ELECTRICAL	A	04-15-13	
E-202	SECOND FLOOR ELECTRICAL	A	04-15-13	
E-203	THIRD FLOOR ELECTRICAL	A	04-15-13	

SECTION 000115 LIST OF DRAWINGS

DRWG NO.	DRAWING NAME	BID PACKS	ISSUE DATE	LATEST REV. DATE
	EXISTING LIFE SAFETY REFERENCE DRAWINGS			
A1.202	FIRST FLOOR LIFE SAFETY PLAN	A	10/10/07	
A1.203	SECOND FLOOR LIFE SAFETY PLAN	A	10/10/07	
A1.204	THIRD FLOOR LIFE SAFETY PLAN	A	10/10/07	
	BID PACK B REFERENCE DRAWINGS			
A-111	ARCHITECTURAL SECOND FLOOR PLAN - BASE BID	A	04-15-13	
A-111A	ARCHITECTURAL SECOND FLOOR PLAN - ALTERNATES	A	04-15-13	
A-112	ARCHITECTURAL MEZZANINE - BASE BID	A	04-15-13	
A-112A	ARCHITECTURAL MEZZANINE - ALTERNATES	A	04-15-13	
A-113	ARCHITECTURAL THIRD FLOOR PLAN - BASE BID		04-15-13	
A-121	ARCHITECTURAL SECOND FLOOR REFLECTED CEILING PLAN - BASE BID	A	04-15-13	
A-121A	ARCHITECTURAL SECOND FLOOR	A	04-15-13	
A-122	ARCHITECTURAL MEZZANINE REFLECTED CEILING PLAN - BASE BID	A	04-15-13	
A-122A	ARCHITECTURAL MEZZANINE REFLECTED CEILING PLAN - ALTERNATES	A	04-15-13	
A-301	BUILDING SECTIONS – BASE BID	A	04-15-13	
A-301A	BUILDING SECTIONS - ALTERNATES	A	04-15-13	

END OF SECTION

SECTION 001113 ADVERTISEMENT FOR BID

Receipt of Bids

Public notice is hereby given that sealed bids for the following prime contract will be received for the construction of Wilmington Campus Renovations located at 100 North DuPont Road, Wilmington, Delaware 19807. Bids will be received at the main office of the Cab Calloway School of the Arts, 100 North DuPont Road, Wilmington, Delaware 19807 until 3:30 PM local time on Thursday, May 2, 2013, at which time they will be publicly opened and read aloud. ***Bidder bears the risk of late delivery. Any bids received after the stated time will be returned unopened.*** The time and location of the bid opening may be extended with a minimum of 2 calendar days notice to the Bidders.

Contract:	A-1 Fire Protection
Contract:	A-2 Elevator
Contract:	A-3 Carpentry & General Work
Contract:	A-4 Mechanical & Plumbing – Pool Pak

Bidding Document

Documents may be viewed and downloaded at EDiS' FTP site after 16 April 2013. Bidders requesting the log on information may obtain user name and password permission by contacting Jane Reese with EDiS Company at **jane.reese@ediscompany.com** or 302-421-2980. Each contractor will be required to provide the following information prior to receiving the log on information: company name, contact name, email address, phone number, fax number and postal mailing address.

It is the responsibility of each bidder to review and coordinate all Project Documents. This includes plans, specifications and addendums. Documents may also be examined at the office of the Construction Manager, EDIS Company, 110 S. Poplar Street, Suite 400, Wilmington, Delaware 19801; the Architect, ABHA Architects, 1621 North Lincoln Street, Wilmington, DE 19806; and the office of Delaware Contractors Association, 527 Christiana Stanton Road, Newark, Delaware 19713.

Bid Security

A bid security in the amount of 10% of the bid including all alternates, plus a consent of surety must accompany each bid. Bid Security shall specify the Owner as the obligee. Owner: Red Clay Consolidated School District, 1502 Spruce Avenue, Wilmington, Delaware 19805.

Pre-Bid Meeting

A pre-bid meeting will be held at the Wilmington Campus, 100 North DuPont Road, Wilmington, Delaware 19807, on 16 April 2013 at 3:00 PM local time. A site visit will be conducted immediately following the pre-bid meeting. **Attendance is Mandatory.**

Questions

Please contact EDiS Company, Vincent Colonna at vcolonna@ediscompany.com or 302-421-2884 with questions.

Conformance to the Delaware Architectural Accessibility Act and the standards of the Architectural Accessibility Board is required on the Project.

Prevailing Wage Rates, as described by Delaware Law, must be adhered to where applicable.

The Red Clay Consolidated School District reserves the right to waive irregularities and to reject any and all bids.

END OF SECTION

SECTION 002113 - INSTRUCTIONS TO BIDDERS

1. DEFINITIONS

1.1 Bidding Documents include the Contract Documents, Invitation to Bid, Instructions to Bidders, the Proposal Forms, Contract, General Conditions of the Contract, Supplementary Conditions, Specifications, Plans, and any Addenda issued prior to receipt of bids.

1.2 All definitions set forth in the General Conditions and the other Contract Documents are applicable to the Bidding Documents.

1.3 "Addenda" are written or graphic instruments issued by the Architect/Engineer prior to the receipt of bids which modify or interpret the Bidding Documents, by additions, deletions, clarifications or corrections. Addenda become part of the contract documents upon execution of the agreement.

1.4 The term Work is defined in 1.1.3 of the General Conditions.

1.5 A "Unit of Work" includes all Work covered by the one or more Sections of the specifications listed under that particular Unit of Work in Section 011100 - SUMMARY OF WORK. A Unit of Work is the smallest portion of the Project for which a separate Bid will be accepted by the Construction Manager. The word "Unit" means "Unit of Work" whenever the context clearly implies "Unit of Work".

1.6 A "Bid" is a complete and properly signed proposal to do one or more Units of Work for the sum stipulated therein.

1.7 A "Bidder" is one who submits a Bid to the Bidding Agency for the Unit or Units of Work indicated therein.

1.8 A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including drawings, which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article. Definitions and explanations to this section are not necessarily either complete or exclusive, but are general for the work to the extent not stated more explicitly in another provision of Contract Documents.

1.9 General Requirements (or Conditions) apply to entire work of Contract and, where so indicated, to other elements which are included in the project.

1.10 The term "indicated" is a cross reference to details, notes or schedules on the Drawings, to other similar means of recording requirements in the Contract

Documents. Where terms such as "shown", "noted", "schedule" and "specified" are used in lieu of "indicate," it is for purpose of helping to locate cross reference and no limitation of location is intended, except as specifically noted.

1.11 Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted" and "permitted" mean "directed by Construction Manager or Architect", "requested by Construction Manager or Architect", etc.

1.12 Where used in conjunction with Construction Manager's or Architect's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of the term "approved" will be held to limitations of Construction Manager's and Architect's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Construction Manager or Architect be interpreted as a release of Contractor from responsibilities to fulfill requirements of the Contract Documents.

1.13 The "Project Site" is the space available to Contractor for performance of the Work, either exclusively or in conjunction with others performing other work as part of the Project. The extent of project site is shown on the Drawings and may or may not be identical with description of the land upon which project is to be built. The Contractor shall visit the site to verify contract or construction limits.

1.14 Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

1.15 Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations as applicable in each instance.

1.16 Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

1.17 An "Installer" is the entity, person or firm, engaged by the Contractor or his subcontractor or sub-subcontractor for the performance of a particular unit of work at the project site, including installation, erection, application and similar required operation. It is a general requirement that such installers be expert in operations they are engaged to perform.

1.18 The duties and obligations of the Contract apply to this Contractor (as defined herein) regardless of similar or identical duties or obligations of other Prime Contractors related to the Project. Therefore, even though other Prime Contractors

may have similar, identical or overlapping duties and obligations, each and every duty and obligation set forth in this Contract is enforceable against this Contractor.

2. BIDDER'S REPRESENTATION

2.1 Each Bidder in submitting its bid represents that:

1. It has read and understands the Bidding Documents and its Bid is made in accordance therewith.

2. Contractor has visited the site; familiarized himself with the local conditions under which the work is to be performed; compared the site with drawings and specifications; satisfied himself of the conditions of delivery, handling and storage of materials and all other matters that may be incidental to the Work before submitting his Bid.

3. Its Bid is based upon the materials and equipment described within the Bidding Documents without exceptions.

2.2 EVIDENCE OF REPRESENTATION

1. Submission of a Bid will be considered as evidence of the bidder's representation. No allowance will subsequently be made to the successful contractor by reason of any error omission on his part, due to his neglect in complying with the requirements of this article.

3. BIDDING DOCUMENTS

3.1 ISSUANCE

1. Bidding documents will be available on CD, free of charge, at the Construction Manager's office. It is the responsibility of each Bidder to review and coordinate all Project Documents. This includes plans, specifications and addendums.

2. Bidding Documents will not be issued to subcontractors or other individuals or organizations who will not be contracting directly with the Owner.

3. The complete set of Bidding Documents shall be used in preparing bids; neither the Owner, the Architect nor the Construction Manager assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

4. The Owner, Architect, and the Construction Manager, in making copies of

Bidding Documents available on the above terms, do so only for the purpose of obtaining bids on the Work and do not confer a license or grant for any other use.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

1. Bidders shall examine the Bidding Documents carefully and shall promptly notify the Construction Manager of any ambiguity, inconsistency or error which they may discover. No request for adjustment of Contract Time or Sum shall be permitted with regard to any purported ambiguity, inconsistency or error not promptly noticed to the Construction Manager.

2. Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Construction Manager to reach him at least seven days prior to the date of receipt of bids.

3. Any interpretation, correction or change of the Bidding Documents will be made by Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections, and changes.

3.3 SUBSTITUTIONS

1. Refer to Specification Section 016200 - MATERIAL AND EQUIPMENT.

2. Substitution requests must be made at least seven (7) days prior to the receipt of bids.

3.4 ADDENDA

1. Addenda will be emailed, mailed, faxed or delivered to each person or firm recorded by the Construction Manager as having received a complete set of the Bidding Documents, and will be available for inspection wherever the Bidding Documents are kept available for that purpose.

2. Sub-Bidders, Suppliers, Manufacturers and others wishing to have Addenda mailed free of charge directly to them should address a letter to the Construction Manager requesting a listing on the Addenda mailing list for this Project. Such letter must include no other subject matter, must clearly identify this Project by name, and must indicate, line for line, exactly how the name and address is to be typed on the envelope. Phone requests will not be accepted. The Construction Manager will endeavor, but expressly does not promise, to mail Addenda directly to those who have properly requested. Such mailing list is for this one Project only.

3. Addenda issued during the time of bidding shall be listed on Bid form in the space provided. Failure of a Bidder to receive any Addendum shall not release the Bidder from any obligations under his Bid, provided said addendum was sent by fax or by U.S. Mail to the address furnished by the bidder for transmittal of mail. Faxed Addenda will be confirmed by U. S. Mail.

4. No Addenda will be issued later than three (3) days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which extends the time or changes the location for the opening of Bids.

4. BIDDING PROCEDURE

4.1 FORM AND STYLE OF BIDS

1. Bids shall be submitted in triplicate upon the proposal form included in these specifications, or upon an exact copy of it.

2. The Bidder shall complete all blank spaces on the Bid form.

3. Where indicated on the Bid form, sums shall be expressed in both words and figures. In case of discrepancy between the two, the written amount shall govern.

4. Any interlineation, alteration or erasure of an entry made in a blank space of the form must be initialed by the signer of the Bid. However, no interlineation, alteration or erasure shall be made in the wording printed on the bid form unless the Bidder is instructed by the Bidding Documents to do so. The Bidders shall add no stipulations or qualifications on the Bid form or accompanying the bid form unless permitted by or instructed by the Bidding Documents to do so.

5. All requested quantities, unit prices and alternates shall be included as part of the bid.

6. All signatures shall be in long hand.

7. The Bidder shall include on the Bid Form, within the Base Bid total costs associated with providing both the Labor and Material Payment and Performance Bonds.

8. The Bidder shall affix his seal to the bid form, if organized as a corporation.

4.2 SUBMISSION OF BIDS

1. Bids shall be deposited at the designated location prior to the time and date for receipt of Bids indicated in the Invitation to Bid, or any extension thereof made by Addendum. The time and location of the bid opening may be extended with a minimum of two (2) calendar days notice to the Bidders. Bids received after the time and date for receipt of Bids will be marked "LATE BID" and returned.

2. The Bid Proposal (3 copies) shall be enclosed in a sealed envelope. The envelope shall be addressed to the Owner, and shall be identified with the Project name, the Bidder's name and address and the Unit of Work included in the Bid.

3. If the Bidder submits his Bid by mail, he shall enclose the above described sealed envelope in a separate mailing envelope with the notation "BID ENCLOSED' on the face thereof.

4. Bids shall include a fully executed Bid Bond, Power of Attorney, Non-collusion Statement, Consent of Surety and Subcontractor listing.

4.3 MODIFICATION OR WITHDRAWAL OF BID

1. A Bidder may modify his Bid in writing at any time prior to the time scheduled for receiving Bids, provided such written modification is received by the Construction Manager prior to said time.

2. Unless specifically authorized, faxed bids will not be considered.

3. No Bidder shall modify, withdraw or cancel his Bid or any part thereof for SIXTY (60) days after the time designed for the receipt of Bids, in the Invitation to Bid. Any further extension of the time will be by mutual consent of the Owner and the Contractor.

4. A Bid may be withdrawn up until the time scheduled for receiving the Bids. Such withdrawal shall be in writing.

5. CONSIDERATIONS OF BIDS

5.1 OPENING OF BIDS

1. Bid shall be publicly opened and read aloud.

5.2 REJECTION OF BIDS

1. The Owner, in its sole discretion, shall have the right to reject any or all bids for

any reason or for no reason whatsoever.

5.3 ACCEPTANCE OF BIDS

1. The Owner, in its sole discretion, shall have the right to waive any informality or irregularity in any Bid received.

2. The Owner shall have the right to accept Alternates in any order or combination.

6. SUBCONTRACT INFORMATION

6.1 SUBMISSION OF SUBCONTRACTOR LIST

1. Should the Contractor fail to utilize any or all of the Subcontractors in the Contractor's Bid statement in the performance of the Work on the public bidding, the Contractor shall be penalized in the amount of (project specific amount *). The Agency may determine to deduct payment of the penalty from the Contractor or have the amount paid directly to the Agency. Any penalty amount assessed against the Contractor may be remitted or refunded, in whole or in part, by the Agency awarding the Contract, only if it is established to the satisfaction of the Agency that the Subcontractor in question has defaulted or is no longer engaged in such business. No claim for the remission or refund of any penalty shall be granted unless an application is filed within one year after the liability of the successful Bidder accrues. All penalty amounts assessed and not refunded or remitted to the Contractor shall be reverted to the State.

   * one (1) percent of the contract amount not to exceed $10,000.

2. Upon request of the Construction Manager, the Bidder shall within seven (7) days of the request submit a list of the other subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) if any, proposed for the various portions of the Work not included in the subcontractors list submitted with the bid.

3. The Bidder will be required to establish to the satisfaction of the Construction Manager the capability and experience of all proposed subcontractors to furnish and perform the work described in the sections of the specifications pertaining to such proposed subcontractor's respective trades.

4. Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner must be used on the work for which they were proposed and accepted, and shall not be changed except with the written approval of the Construction Manager.

7. EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

During the performance of this Contract, the Contractor agrees as follows:

7.1 The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex or national origin. The Contractor will take affirmative action to ensure the applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, sex or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

7.2 The Contractor will, in all solicitants or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color sex, or national origin.

7.3 The term "Contract for public works" means construction, reconstruction, demolition, alteration and repair work and maintenance work paid for, in whole or in part, with public funds.

7.4 The Secretary of the Department of Labor shall be responsible for the administration of this section and shall adopt such rules and regulations and issue such orders as he deems necessary to achieve the purpose thereof, provided that no requirement established herby shall be in conflict with subchapter 6904 of this title.

8. PREVAILING WAGE REQUIREMENT

8.1 Wage Provisions: In accordance with Delaware Code, Title 29, Section 6960, renovation projects whose total cost shall exceed $15,000 and $100,000 for new construction, the minimum wage rates for various classes of laborers and mechanics shall be as determined by the Department of Labor, Division of Industrial Affairs of the State of Delaware.

8.2 The prevailing wage shall be the wage paid to a majority of employees performing similar work as reported in the Department's annual prevailing wage survey or in the absence of a majority, the average paid to all employees reported.

8.3 The Contractor shall pay all mechanics and labors employed directly upon the site of work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics.

8.4 The scale of the wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work.

8.5 Every contract based upon these specifications shall contain a stipulation that certified sworn payroll reports be maintained by every Contractor and Subcontractor performing work upon the site of construction. The Contractor and Subcontractor shall keep and maintain the sworn payroll information for a period of 2 years from the last day of the work week covered by the payroll. A certified copy of these payroll reports shall be made available: 1) Effective June 30, 2007, all Contractors performing work on public work projects are required to furnish sworn payroll records on a weekly basis to the Department of Labor. Specifically, 29 Del. C. § 6960(c) states that "(e)very contract… shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly." Further, that "(t)he Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll." Lastly, the failure to submit payroll reports shall be subject to a civil penalty of not less than $1,000 nor more than $5,000 for each violation. 29 Del. C. § 6960(e). Sworn payroll information shall consist of a fully completed and notarized report on a form provided upon request by the Department of Labor. *See* Delaware Prevailing Wage Regulations VII A.2(c)"; 2) upon request by the public or for copies thereof. However, a request by the public must be made through the Department of Labor. The requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Department of Labor in accordance with the Department's copying fee policy. The public shall not be given access to the records at the principal office of the Contractor or Subcontractor; and 3) the certified payroll records shall be on a form provided by the Department of Labor or shall contain the same information as the form provided by the Department and shall be provided within 10 days from receipt of notice requesting the records from the Department of Labor.

9. PERFORMANCE AND PAYMENT BONDS

9.1 The Contractor shall be required to furnish bonds covering the faithful performance of the contract and the payment of all obligations arising thereunder with such sureties secured through the Bidder's usual sources as may be agreeable to the parties. The Owner shall be noted as the obligee. The Owner is the Red Clay

Consolidated School District.

9.2 The performance and payment bonds shall each be in an amount equal to 100% of the Contract Sum as adjusted from time to time. The Owner shall be noted as the obligee. The Owner is the Red Clay Consolidated School District.

9.3 TIME OF DELIVERY AND FORM OF BONDS

1. The Bidder shall deliver the required bonds within seven (7) days from receipt of request from the Construction Manager.

2. The performance and payment bonds shall be written in the form found in Section 00600 Bonds.

3. The required bonds shall be by an authorized agent of the bonding company and shall be accompanied by a certified and current copy of the bonding agent's Power of Attorney, indicating the monetary limit of such power. The bonding company shall be licensed to operate in the state which the work is to be performed.

10. EXECUTION OF AGREEMENT

10.1 The Agreement will be written on a contract form, stipulated by the Owner, a copy of which is included in the Specifications.

10.2 The Bidder shall, within seven (7) days following its presentation, execute the Agreement and return it to the Construction Manager.

10.3 The Bidder agrees to commence work within seven (7) days of 1) execution of the Agreement, or 2) receipt of a Letter of Intent to execute the Agreement, or other authorization to proceed, if furnished at an earlier date.

10.4 If the successful Bidder fails to execute the required Contract and Bond, as aforesaid, within twenty (20) days after the date of official Notice of the Award of the Contract, their Bid guaranty shall immediately be taken and become the property of the State for the benefit of the Agency as liquidated damages, and not as a forfeiture or as a penalty. Award will then be made to the next lowest qualified Bidder of the Work or readvertised, as the Agency may decide.

11. GENERAL COMMENTS

11.1 JOINT VENTURE AGREEMENTS

In the event of a mandatory pre-bid meeting, representatives of both Joint Ventures

must attend the pre-bid meeting and must be an officer and co-joint venture of the corporations involved.

Each Joint Venture shall be qualified and capable to complete the project with their own forces.

Included with the bid submission, and as a requirement to bid, a copy of the executed Joint Venture Agreement shall be submitted and signed by all Joint Ventures involved.

All required bid bonds, performance bonds, material and labor payment bonds must be executed by both Joint Ventures and be placed in both of their names.

All required insurance certificates shall name both Joint Ventures.

Both Joint Ventures shall sign the bid form and shall submit a valid Delaware Business License Number with their bid or shall state that the process of application for a Delaware Business License has been initiated.

Both Joint Ventures shall include their Federal E. I. Number with the bid.

Due to exceptional circumstances and for good cause shown, one or more of these provisions may be waived at the discretion of the Owner.

11.2 LICENSE APPLICATION REQUIRED TO BID

A business license application must be initiated prior to or in conjunction with the submission of a bid on competitively bid contracts exceeding $50,000; or in the case of a subcontractor, prior to the submission of a bid by the general contractor. The license application procedure may be initiated by visiting or calling the Division of Revenue.

11.3 BONDING REQUIREMENTS FOR NON-RESIDENT CONTRACTORS

All non-resident contractors are reminded that they must supply a surety or cash bond to the Division of Revenue equal to six percent (6%) of the total of all contracts exceeding $20,000 for construction within this state. For Division of Revenue purposes, cash bonds and bank letters of credit issued by financial institutions will be accepted on all contracts.

11.4 CONTRACT AWARD TO NON-RESIDENT CONTRACTORS

Every architect, or professional engineer or contractor or construction manager engaging in the practice of such profession shall furnish the Department of Finance

within 10 days after entering into any contract with a contractor or subcontractor not a resident of this State, a statement of the total value of such contract or contracts together with the names and addresses of the contracting parties.

11.5 STATE LICENSE AND TAX REQUIREMENTS

The Contractor and Subcontractor shall be licensed to do business in the State of Delaware and shall pay al fees and taxes due under State laws. In conformance with Section 2503, Chapter 25, Title 30, Delaware Code, "the Contractor shall furnish the State Tax Department within ten (10) days after award of the Contract, a statement of the total values of each contract and subcontract, together with the names and addresses of the contracting parties. All Contractors are required to submit a copy of their City of Wilmington and New Castle County business license to the Construction Manager.

11.6 RIGHT TO AUDIT RECORDS

The Owner (contracting agency) shall have the right to audit the books and records of a Contractor or any Subcontractor under any Contract or Subcontract to the extent that the books and records relate to the performance of the Contract or Subcontract.

Said books and records shall be maintained by the Contractor for a period of three (3) years from the date of final payment under the Prime Contract and by the Subcontractor for a period of three (3) years from the date of final payment under the Subcontract.

11.7 LIQUIDATED DAMAGES

Contractors shall be held liable for liquidated damages if work is not completed prior to the completion date of each phase. Details regarding liquidated damages can be found in Specification Section 011100-6.33.

END OF SECTION

CONTRACT A-1 FIRE PROTECTION
BID FORM

For Bids Due: _____ To: Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, Delaware 19805

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.: _____ Taxpayer ID No.: _____

(Other License Nos.): _____

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES (Bidders must review Section 012300 Alternates for a complete description of alternates)

Alternate No. 1: Sprinklers in Black Box

Add/Deduct _____($_____)

Alternate No. 2: Elevator to Lighting Booth

Add/Deduct _____($_____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

N/A

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed ten percent (10%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for sixty (60) days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address:_____
_____
_____
_____

Witness: _____ By: _____

(Authorized Signature)

(SEAL) _____

(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.

Subcontractor Category	Subcontractor	Address (City & State)
1. Fire Protection	_____	_____

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date

All the terms and conditions of A-1 Fire Protection have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the Red Clay Consolidated School District in the sum of _____ _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. A-1 Fire Protection to be paid to the Red Clay Consolidated School District for the use and benefit of the Red Clay Consolidated School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators. and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the Red Clay Consolidated School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the Red Clay Consolidated School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this____day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

END OF SECTION

CONTRACT A-2 ELEVATOR
BID FORM

For Bids Due: _____ To: Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, Delaware 19805

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.: _____ Taxpayer ID No.: _____

(Other License Nos.): _____

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES (Bidders must review Section 012300 Alternates for a complete description of alternates)

Alternate No. 1: Sprinklers in Black Box

Add/Deduct _____($_____)

Alternate No. 2: Elevator to Lighting Booth

Add/Deduct _____($_____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

N/A

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed ten percent (10%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for sixty (60) days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address:_____
_____
_____
_____

Witness: _____ By: _____

(Authorized Signature)

(SEAL) _____

(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.

Subcontractor Category	Subcontractor	Address (City & State)
1. Elevator	_____	_____

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date

All the terms and conditions of A-2 Elevator have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the Red Clay Consolidated School District in the sum of _____ _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. A-2 Elevator to be paid to the Red Clay Consolidated School District for the use and benefit of the Red Clay Consolidated School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators. and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the Red Clay Consolidated School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the Red Clay Consolidated School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this____day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

END OF SECTION

CONTRACT A-3 CARPENTRY & GENERAL WORK
BID FORM

For Bids Due: _____ To: Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, Delaware 19805

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.: _____ Taxpayer ID No.: _____

(Other License Nos.): _____

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES (Bidders must review Section 012300 Alternates for a complete description of alternates)

Alternate No. 1: Sprinklers in Black Box

Add/Deduct _____($_____)

Alternate No. 2: Elevator to Lighting Booth

Add/Deduct _____($_____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

	Add	Deduct
1. **Unit Price No. 1:** Price per square foot to remove and reinstall the existing acoustical ceiling grid and tiles. This price includes the removal and storage of the existing grid, supporting of existing electrical, mechanical, fire alarm, fire sprinkler, speaker, etc.; preparation of the existing surfaces, and all required grid anchors and accessories.	_____	_____

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed ten percent (10%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for sixty (60) days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address:_____
_____
_____
_____

Witness: _____ By: _____
(Authorized Signature)

(SEAL) _____
(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.

Subcontractor Category	Subcontractor	Address (City & State)
1. Carpentry	_____	_____
2. Ceramic Tile	_____	_____
3. Electrical	_____	_____

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date

All the terms and conditions of A-3 Carpentry & General Work have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the Red Clay Consolidated School District in the sum of _____ _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. A-3 Carpentry & General Work to be paid to the Red Clay Consolidated School District for the use and benefit of the Red Clay Consolidated School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators. and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the Red Clay Consolidated School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the Red Clay Consolidated School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this____day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

END OF SECTION

CONTRACT A-4 MECHANICAL & PLUMBING – REPLACE POOL PAK

BID FORM

For Bids Due: _____ To: Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, Delaware 19805

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.: _____ Taxpayer ID No.: _____

(Other License Nos.): _____

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES (Bidders must review Section 012300 Alternates for a complete description of alternates)

Alternate No. 1: Sprinklers in Black Box

Add/Deduct _____($_____)

Alternate No. 2: Elevator to Lighting Booth

Add/Deduct _____($_____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

N/A

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed ten percent (10%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for sixty (60) days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address:_____
_____
_____
_____

Witness: _____ By: _____

(Authorized Signature)

(SEAL) _____

(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.

Subcontractor Category	Subcontractor	Address (City & State)
1. Mechanical	_____	_____
2. Plumbing	_____	_____
3. Sheet Metal	_____	_____
4. Insulation	_____	_____
5. Electrical	_____	_____

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date

All the terms and conditions of A-4 Mechanical – Replace Pool Pak have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the Red Clay Consolidated School District in the sum of _____ _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. A-4 Mechanical – Replace Pool Pak to be paid to the Red Clay Consolidated School District for the use and benefit of the Red Clay Consolidated School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators. and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the Red Clay Consolidated School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the Red Clay Consolidated School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this____day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

END OF SECTION

SECTION 005200 - AGREEMENT

1. SUMMARY

1.1. The Agreement Form for this Project is either the American Institute of Architects Standard Form of Agreement between Owner and Contractor, Construction Manager as Advisor, AIA Document A132 - 2009 Edition

1.2 A copy of AIA Document A132 – 2009 Edition is bound into this Project Manual following this page.

1.2.1 Under Article 5.1.4.5 add the following:

"Upon completion of the work under the Contract, the Owner may release 60% of the amount then retained. The balance of the amount retained will be held until:

A. All reports required of the Contract are received;
B. All Subcontractors in trades listed on the Bid Form are paid by the Contractor, unless the amount owed to the Subcontractor is disputed, in which case the Owner may withhold 150% of the amount withheld by the Contractor in its dispute with the Subcontractor; and
C. Final payment is authorized by the Owner."

END OF SECTION

AIA® Document A132™ – 2009

Standard Form of Agreement Between Owner and Contractor, *Construction Manager as Adviser Edition*

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

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

Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, DE 19805

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

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

Wilmington Campus Renovations
100 North DuPont Road
Wilmington, DE 19801

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

EDiS Company
110 South Poplar Street, Suite 400
Wilmington, DE 19801

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

ABHA Architects
1621 North Lincoln Street
Wilmington, DE 19806

The Owner and Contractor agree as follows.

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

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

This document is intended to be used in conjunction with AIA Documents A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232™–2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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2 THE WORK OF THIS CONTRACT

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ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

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Portion of the Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[ ] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below

[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below. Based on the selection above, also complete either Section 5.1.4, 5.1.5 or 5.1.6 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Stipulated Sum shall be ($), subject to additions and deletions as provided in the Contract Documents.

§ 4.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.2.3 Unit prices, if any:
(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.2.4 Allowances included in the Stipulated Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Allowance

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

§ 4.3.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

§ 4.3.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

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§ **4.3.3** The method of adjustment of the Contractor's Fee for changes in the Work:

§ **4.3.4** Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ **4.3.5** Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rate paid at the place of the Project.

§ **4.3.6** Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ **4.3.7** The Contractor shall prepare and submit to the Construction Manager for the Owner, in writing, a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the items in Section A.1 of Exhibit A, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price
§ **4.4.1** The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

§ **4.4.2** The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ **4.4.3** The method of adjustment of the Contractor's Fee for changes in the Work:

§ **4.4.4** Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ **4.4.5** Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rate paid at the place of the Project.

§ **4.4.6** Unit Prices, if any:
(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.4.7 Guaranteed Maximum Price
§ **4.4.7.1** The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by changes in the Work as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.
(Insert specific provisions if the Contractor is to participate in any savings.)

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§ 4.4.7.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

§ 4.4.7.3 Allowances included in the Guaranteed Maximum Price, if any:
(Identify and state the amounts of any allowances, and state whether they include labor, materials, or both.)

Item	Allowance

§ 4.4.7.4 Assumptions, if any, on which the Guaranteed Maximum Price is based:

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

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

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the day of the month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment shall be made by the Owner not later than ( ) days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

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

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

§ 5.1.4.3 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent (%);

.3 Subtract the aggregate of previous payments made by the Owner; and

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.4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.4.4 The progress payment amount determined in accordance with Section 5.1.4.3 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to percent (%) of the Contract Sum, less such amounts as the Construction Manager recommends and the Architect determines for incomplete Work and unsettled claims; and

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.5 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price

§ 5.1.5.1 With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit A, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor; less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

§ 5.1.5.2 Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.

§ 5.1.5.3 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take the Cost of the Work as described in Exhibit A, Determination of the Cost of the Work;

.2 Add the Contractor's Fee, less retainage of percent (%). The Contractor's Fee shall be computed upon the Cost of the Work described in that Section at the rate stated in that Section; or if the Contractor's Fee is stated as a fixed sum, an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;

.3 Subtract retainage of percent (%) from that portion of the Work that the Contractor self-performs;

.4 Subtract the aggregate of previous payments made by the Owner;

.5 Subtract the shortfall, if any, indicated by the Contractor in the documentation required by Article 5 or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or withdrawn a Certificate for Payment as provided in Section 9.5 of AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 5.1.5.4 The Owner, Construction Manager and Contractor shall agree upon (1) a mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used

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amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

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

§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price

§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner or Architect to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor; less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

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

§ 5.1.6.3 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work for which the Contractor has made or intends to make actual payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 5.1.6.4 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.10 of AIA Document A232–2009;

.2 Add that portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work, or if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing;

.3 Add the Contractor's Fee, less retainage of percent (%). The Contractor's Fee shall be computed upon the Cost of the Work at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, shall be an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;

.4 Subtract retainage of percent (%) from that portion of the Work that the Contractor self-performs;

.5 Subtract the aggregate of previous payments made by the Owner;

.6 Subtract the shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.7 Subtract amounts, if any, for which the Construction Manager or Architect have withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A232–2009.

§ 5.1.6.5 The Owner and the Contractor shall agree upon a (1) mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.6.6 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Construction Manager or Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; that the

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Construction Manager or Architect have made exhaustive or continuous on-site inspections; or that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

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

§ 5.2 Final Payment

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

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232–2009, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit A, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and

.3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232–2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232–2009, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[ ] Arbitration pursuant to Section 15.4 of AIA Document A232–2009.

[ ] Litigation in a court of competent jurisdiction.

[ ] Other: *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009.

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§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price
§ 7.2.1 Subject to the provisions of Section 7.2.2 below, the Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.2.2 The Contract may be terminated by the Owner for cause as provided in Article 14 of AIA Document A232–2009; however, the Owner shall then only pay the Contractor an amount calculated as follows:

.1 Take the Cost of the Work incurred by the Contractor to the date of termination;

.2 Add the Contractor's Fee computed upon the Cost of the Work to the date of termination at the rate stated in Sections 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion; and

.3 Subtract the aggregate of previous payments made by the Owner.

§ 7.2.3 If the Owner terminates the Contract for cause when the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, and as provided in Article 14 of AIA Document A232–2009, the amount, if any, to be paid to the Contractor under Section 14.2.4 of AIA Document A232–2009 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.2.

§ 7.2.4 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders.

§ 7.2.5 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009; in such case, the Contract Sum and Contract Time shall be increased as provided in Section 14.3.2 of AIA Document A232–2009, except that the term 'profit' shall be understood to mean the Contractor's Fee as described in Sections 4.3.2 and 4.4.2 of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS
§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

%

§ 8.3 The Owner's representative:
(Name, address and other information)

§ 8.4 The Contractor's representative:
(Name, address and other information)

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

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are, AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:

.1 AIA Document A132™–2009, Exhibit A, Determination of the Cost of the Work, if applicable.

.2 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:

.3 AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, if completed, or the following:

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.4 Other documents, if any, listed below:
(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232–2009 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232–2009.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232–2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount ($0.00)

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

Red Clay Consolidated School District

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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SECTION 006113 – PERFORMANCE AND PAYMENT BONDS

1. PERFORMANCE AND PAYMENT BONDS

1.1 Bonds must be in the following form:

1. Form of Performance Bond (attached).
2. Form of Payment Bond (attached).

SECTION 00 61 13 - FORM OF PAYMENT BOND

Bond Number:

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal ("Principal"), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety ("Surety"), are held and firmly bound unto the State of Delaware, Red Clay Consolidated School District ("Owner"), in the amount of _____ ($_____), to be paid to Owner, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this _____ day of_____, 20_____.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, who has been awarded by Owner that certain contract known as Contract No. _____dated the _____ day of _____, 20__ (the "Contract"), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him. her, them or any of them, for all such materials, labor and service for which Principal is liable, shall make good and reimburse Owner sufficient funds to pay such costs in the completion of the Contract as Owner may sustain by reason of any failure or default on the part of Principal, and shall also indemnity and save harmless Owner from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of Surety and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and Surety hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to Surety as though done or omitted to be done by or in relation to Principal.

Surety hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of Surety and its bond. Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to Surety or Contractor may be mailed or delivered

to them at their respective addresses shown below.
IN WITNESS WHEREOF, Principal and Surety have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

By:_____(SEAL)
Name: Name:
Title:
(Corporate Seal)

SURETY

Name: _____

Witness or Attest: Address: _____

By: _____(SEAL)
Name: Name:
Title:
(Corporate Seal)

SECTION 00 61 13 - FORM OF PERFORMANCE BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal ("Principal"), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety ("Surety"), are held and firmly bound unto the State of Delaware, Red Clay Consolidated School District ("Owner"), in the amount of_____ ($_____) to be paid to Owner, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns. jointly and severally, for and in the whole, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20_____.

NOW THE CONDITION OF THIS OBLICATION IS SUCH, that if Principal, who has been awarded by Owner that certain contract known as Contract No. _____ dated the _____ day of _____, 20 (the "Contract"), which Contract is incorporated herein by reference, shall well and truly provide and furnish all materials, appliances and tools and perform all the work required under and pursuant to the terms and conditions of the Contract and the Contract Documents (as defined in the Contract) or any changes or modifications thereto made as therein provided, shall make good and reimburse Owner sufficient funds to pay the costs of completing the Contract that Owner may sustain by reason of any failure or default on the part of Principal, and shall also indemnify and save harmless Owner from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, hereby stipulates and agrees, if requested to do so by Owner, to fully perform and complete the work to be performed under the Contract pursuant to the terms, conditions and covenants thereof, if for any cause Principal fails or neglects to so fully perform and complete such work

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of Surety and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and Surety hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to Surety as though

done or omitted to be done by or in relation to Principal.
Surety hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of Surety and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to Surety or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

By:_____(SEAL)
Name:
Name:
Title:
(Corporate Seal)

SURETY

Name: _____

Witness or Attest: Address: _____

By: _____(SEAL)
Name:
Name:
Title:
(Corporate Seal)

END OF SECTION

SECTION 006216 – CERTIFICATE OF INSURANCE

In conjunction with Insurance Requirements AIA General Conditions, Article 11, the Contractor shall be bound by the following limits of liability insurance (for Contracts under this Bid Pac). The Contractor shall use the standard "ACCORD" for titled "Certificate of Insurance" in submitting his liability insurance limits. The required limits to be inserted in accordance with the sample "ACCORD" form in this section:

GENERAL NOTES

1. Other Insurance

   1.1 Contractor shall carry any necessary insurance required to cover Owned and Rental equipment that may be necessary for them to use in the performance of the Work.

2. Contractor shall have the following additional items added to his required "ACCORD" form Certificate of Insurance:

   1. Name and Address of Insured (Contractor).
   2. Description of Operations/Locations -

3. Added Insured – Red Clay Consolidated School District and EDiS Company

4. Certificate Holder – Red Clay Consolidated School District
   1502 Spruce Avenue
   Wilmington, Delaware 19805

Contractors shall note that although not a part of AIA Document A232 - 2009 Edition, these additional articles apply as noted to this Project.

A sample certificate is bound into the Project Manual immediately following this Document.

END OF SECTION

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY) XX/XX/XX

PRODUCER

PRODUCER INSURANCE AGENCY
PO BOX
PRODUCER STREET ADDRESS
PRODUCER CITY, ST PROD ZIP

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURED

SAMPLE SUBCONTRACTOR CERTIFICATE
(REQUIRED MINIMUM INSURANCE)

INSURER A: XXXXXX
INSURED B XXXXXX
INSURER C: XXXXXX
INSURER D:
INSURER E:

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	DATE (MM/YY)	LIMITS	
	GENERAL LIABILITY	XXXXXXXXXXXXXXX	XXXXXXXX	XXXXXXXXXX	EACH OCCURRENCE	$ 1,000,000
	X COMMERCIAL GENERAL LIABILITY				FIRE DAMAGE (Any one fire)	$ 300,000
	CLAIMS MADE X OCCUR				MED EXP (Any one person)	$ 10,000
					PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:				GENERAL AGGREGATE	$ 2,000,000
	POLICY X PRO-JECT LOC				PRODUCTS - COMP/OP AGG	$ 2,000,000
	AUTOMOBILE LIABILITY	XXXXXXXXXXXXXXXX	XXXXXXXXXXX	XXXXXXXXXXX	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO				BODILY INJURY (Per person)	$
	ALL OWNED AUTOS					
	SCHEDULED AUTOS				BODILY INJURY (Per accident)	$
	X HIREDAUTOS					
	X NON-OWNED AUTOS				PROPERTY DAMAGE (Per accident)	$
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
	ANY AUTO				OTHER THAN: AUTO ONLY: EA ACC	$
					AGG	$
	EXCESS LIABILITY	XXXXXXXXXXXXXXX	XXXXXXXXXXX	XXXXXXX	EACH OCCURRENCE	$ 5,000,000
	X OCCUR CLAIMS MADE				AGGREGATE	$ 5,000,000
	DEDUCTIBLE					$
	RETENTION $					$
						$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	XXXXXXXXXXXXXXX	XXXXXXXXXXX	XXXXXXXXXX	X WC STATUTORY LIMITS / OTHER	$
					E.L. EACH ACCIDENT	$ 500,000
					E.L. DISEASE - EA EMPLOYEE	$ 500,000
					E.L. DISEASE - POLICY LIMIT	$ 500,000
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

Name of Project: Wilmington Campus Renovations – Red Clay Consolidated School District and EDiS Company shall be named as Additional Insureds for both ongoing and completed operations. The endorsements providing the Additional Insured status for ongoing and completed operations must be attached to the Certificate of Insurance.

CERTIFICATE HOLDER X ADDITIONAL INSURED; INSURER LETTER: ——— CANCELLATION

Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, DE 19805

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

ACORD 25-S (7/97)

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SECTION 007200 – GENERAL CONDITIONS

1. SUMMARY

1.1. The General Conditions for this Project are the American Institute of Architects General Conditions of the Contract for Construction, Construction Manager as Advisor Edition, AIA Document A232 - 2009 Edition.

1.2 A copy of AIA Document A232 - 2009 Edition is bound into this Project Manual following this page.

END OF SECTION

SECTION 007200 – GENERAL CONDITIONS

1. SUMMARY

1.1. The General Conditions for this Project are the American Institute of Architects General Conditions of the Contract for Construction, Construction Manager as Advisor Edition, AIA Document A232 - 2009 Edition.

1.2 A copy of AIA Document A232 - 2009 Edition is bound into this Project Manual following this page.

END OF SECTION

AIA® Document A232™ – 2009

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:
(Name, and location or address)

Wilmington Campus Renovations

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

EDiS Company
110 South Poplar Street, Suite 400
Wilmington, DE 19801

THE OWNER:
(Name, legal status and address)

Red Clay Consolidated School District
1502 Spruce Avenue
Wilmington, DE 19805

THE ARCHITECT:
(Name, legal status and address)

ABHA Architects
1621 North Lincoln Street
Wilmington, DE 19806

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

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

This document is intended to be used in conjunction with AIA Documents A132™–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

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

§ 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 the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their 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 other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 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 and certify termination of the Agreement under Section 14.2.2.

§ 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.

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

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

§ 1.6 Transmission of Data in Digital Form

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

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do 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 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

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portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. 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.

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

§ 2.2.5 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.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner's Right to Stop the Work

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

§ 2.4 Owner's Right to Carry Out the Work

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

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their 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 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and 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 Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

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

§ 3.3 Supervision and Construction Procedures

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

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§ 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 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 the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

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

§ 3.5 Warranty

The Contractor warrants to the Owner, Construction Manager, 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 with 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 Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof 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 Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay 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, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction

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Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, 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, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, 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 furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager 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 Schedules

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

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The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

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

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are 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 Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, 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

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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 reviewed and approved by the Architect.

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

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

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

§ 3.13 Use of Site

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

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

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

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager,

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Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, 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, Construction Manager and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and 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 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 AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 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.

§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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

§ **4.1.4** If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ **4.2.1** The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and 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. 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 report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ **4.2.3** The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ **4.2.4** The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ **4.2.5** The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ **4.2.6 Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

§ **4.2.7** The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ **4.2.8** The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general

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whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 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. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect 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 Construction Manager and 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 Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7. and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related

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documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

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

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 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 so rendered in good faith.

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

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request 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 other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

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

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager 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, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager 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,

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, 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 responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager 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 in writing; 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 such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

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§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor 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's own forces, Construction Manager and other Multiple Prime 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's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors 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 delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

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

§ 6.2.5 The Owner and other Multiple Prime Contractors 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, other Multiple Prime 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 Construction Manager, with notice to 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, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager 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, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;

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.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 Construction Manager and signed by the Owner, Construction Manager 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 7.3.7.

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

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in 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 Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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

§ 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 Construction Manager and Architect. When

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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 Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The 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 Construction Manager and 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 Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

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

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

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

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

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

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ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material 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 Construction Manager and Architect, but not yet included in Change Orders.

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. 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, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided

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in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 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 Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material 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 Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of

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subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

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

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

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project 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 Construction Manager and 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 Construction Manager 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 Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

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

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

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary

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liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's 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 Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager 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 shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so 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 notify the Construction Manager, and the Contractor and Construction Manager shall jointly 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 list, the Architect, assisted by the Construction Manager, 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 list, which is not sufficiently complete in accordance with the requirements of 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, assisted by the Construction Manager, to determine Substantial Completion.

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

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

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly 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

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be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, 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 completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project 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 through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. 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. If such lien 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 such lien, 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 Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

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

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

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§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those 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. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors.
The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

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

.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
.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; and
.4 construction or operations by the Owner or other Contractors.

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

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 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, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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, Construction Manager and Architect.

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

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured,

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shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. 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 report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a 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, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resumed upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their 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 materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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

§ 10.3.6 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 indemnify 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 Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set

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forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
.4 Claims for damages insured by usual personal injury liability coverage;
.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
.7 Claims for bodily injury or property damage arising out of completed operations; and
.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

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

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

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

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

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

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

§ 11.3.2 **Boiler and Machinery Insurance.** The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 **Loss of Use Insurance.** The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

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

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining 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, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

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

§ 11.3.7 **Waivers of Subrogation.** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager,

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Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance 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 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor's expense without change in the Contract Time.

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

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§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

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

§ 12.2.2 After Substantial Completion

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

§ 12.2.2.2 The one-year period 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, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors 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 except that, 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

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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 such 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 such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 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.

§ 13.4.2 No action or failure to act by the Owner, Construction Manager, 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 in writing.

§ 13.5 Tests and Inspections

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

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and 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 Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

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

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

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

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

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may 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.

§ 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time 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 the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

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 or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires 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 Construction Manager has not certified or 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, 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 promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has 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' written notice to the Owner, Construction Manager and 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 for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

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§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and 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, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, 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 the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. 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 this 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 written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

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

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; 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 Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

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

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§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. 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. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

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

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

§ 15.1.6 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 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, 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 arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no 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

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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 such 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 and Construction Manager, if the Architect or Construction Manager 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 an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, 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 15.1.6 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 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. 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

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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 Either party, at its sole discretion, 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 Either party, at its sole discretion, 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 the Owner and Contractor under this Agreement.

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SUPPLEMENTARY GENERAL CONDITIONS A232-2009

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A232-2009. Where a portion of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

TABLE OF ARTICLES

1. GENERAL PROVISIONS
2. OWNER
3. CONTRACTOR
4. ADMINISTRATION OF THE CONTRACT
5. SUBCONTRACTORS
6. CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7. CHANGES IN THE WORK
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9. PAYMENTS AND COMPLETION
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11. INSURANCE AND BONDS
12. UNCOVERING AND CORRECTION OF WORK
13. MISCELLANEOUS PROVISIONS
14. TERMINATION OR SUSPENSION OF THE CONTRACT

ARTICLE 1: GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

Delete the last sentence in its entirety and replace with the following:

"The Contract Documents also include Advertisement for Bid, Instructions to Bidder, all documents which are part of the Bid package, including but not limited to sample forms, the Bid Form, the Contractor's completed Bid and the Award Letter."

1.1.2 THE CONTRACT

Add the following text at the end of subparagraph (5):

"except as set forth in § 3.7.3, §5.3 and § 5.4."

Add the following new Section: 1.10 Terms Used

"The terms "knowledge", "recognize", and "discover", their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows, recognizes and discovers in exercising the care, skill and diligence required by the Contract Documents. The term "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care, skill, and diligence required of the Contractor by the Contract Documents."

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following Paragraphs:

1.2.4 In the case of an inconsistency, missing or conflicting information between the Drawings and the Specifications, Contract Documents or between the Contract Documents and applicable standards, codes and ordinances, or within any Contract Document not clarified by addendum, the Contractor shall (i) provide the better quality or greater quantity of Work, or (ii) comply with the more stringent requirements. The Contractor shall submit its proposed work to Architect for review and the work shall be provided in accordance with the Architect's interpretation. The terms and conditions of this Section 1.2.4, however, shall not relieve the Contractor of any of the obligations set forth in the Contract Documents, including Sections 3.2 and 3.7.

1.2.5 The word "PROVIDE" as used in the Contract Documents shall mean "FURNISH AND INSTALL" and shall include, without limitation, all labor, materials, equipment, transportation, services and other items required to complete the Work.

1.2.6 The word "PRODUCT" as used in the Contract Documents means all materials, systems and equipment.

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

Delete Paragraph 1.5.1 in its entirety and replace with the following:

"All pre-design studies, drawings, specifications and other documents, including those in electronic form, prepared by the Architect under this Agreement are, and shall remain, the property of the Owner whether the Project for which they are made is executed or not. Such documents may be used by the Owner to construct one or more like Projects without the approval of, or additional compensation to, the Architect. The Contractor, Subcontractors, Sub-subcontractors and Material or Equipment Suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or Material and Equipment Supplier on other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and Architect's consultants.

The Architect shall not be liable for injury or damage resulting from the re-use of drawings and specifications if the Architect is not involved in the re-use Project. ."

Delete Paragraph 1.5.2 in its entirety.

ARTICLE 2: OWNER

2.1 General

2.1.2 Delete Paragraph 2.1.2 in its entirety.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 Delete the last sentence in this paragraph.

2.2.3 Add the following sentence:

"The Contractor shall at their expense contact all appropriate agencies or utilities to determine the location of all Utilities and, at their expense, shall bear the costs to accurately identify the location of all underground utilities in the area of their excavation and shall bear all cost for any repairs required, together with being solely responsible for any and all other claims, charges, damages, expenses, fees or liabilities arising out of any acts or omissions in failing to accurately identify said utilities."

2.2.5 Delete Subparagraph 2.2.5 in its entirety and substitute the following:

2.2.5 The Contractor shall be furnished free of charge up to five (5) sets of the Drawings and Project Manuals. Additional sets will be furnished at the cost of reproduction, postage and handling.

2.3 Insert the following words after "repeatedly" in the second line: "or materially".

2.4 Delete the last sentence and substitute the following new sentence:

"If the payments then or thereafter due to the Contractor are not sufficient to cover such amount, at the Owner's option, the excess shall be deducted from any payment thereafter due to the Contractor or shall be paid by the Contractor immediately upon demand of the Owner."

ARTICLE 3: CONTRACTOR

3.1.4 Insert the word "observations" after the word "test" in the last line of the sentence.

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

Delete the third sentence in Paragraph 3.2.4.

3.2.1 Add the following text at the end of the existing subparagraph:

"Prior to execution of the Agreement, the Contractor and each Subcontractor has evaluated and satisfied themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation: (i) the location, condition, layout and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, (iv) availability and cost of materials, tools and equipment, and (v) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site as it relates to the Work. Except as set forth in Section 10.3, the Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or the Contract Time in connection with any failure by the Contractor or any Subcontractor to have complied with the requirements of this Section 3.2.1."

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.2 Add the following text at the end of the existing sentence: "and for any damages, losses, costs, and expenses resulting from such acts or omissions."

Add the following Paragraphs:

3.3.2.1 The Contractor shall immediately remove from the Work, whenever requested to do so by the Owner, any person who is considered by the Owner or Architect to be incompetent or disposed to be disorderly, or who for any reason is not satisfactory to the Owner, and that person shall not again be employed on the Work without the consent of the Owner or the Architect.

3.3.4 The Contractor must provide suitable storage facilities at the Site for the proper protection and safe storage of their materials. Consult the Owner and the Architect before storing any materials.

3.3.5 When any room is used as a shop, storeroom, office, etc., by the Contractor or Subcontractor(s) during the construction of the Work, the Contractor making use of these areas will be held responsible for any repairs, patching or cleaning arising from any acts or omissions with such use.

3.4 LABOR AND MATERIALS

Add the Following Paragraphs:

3.4.4 Before starting the Work, each Contractor shall carefully examine all preparatory Work that has been executed to receive their Work. Check carefully, by whatever means are required, to insure that its Work and adjacent, related Work, will finish to proper contours, planes and levels. Promptly notify the General Contractor/Construction Manager of any defects or imperfections in

preparatory Work which will in any way affect satisfactory completion of its Work. Absence of such notification will be construed as an acceptance of preparatory Work and later claims of defects will not be recognized and are expressly waived.

3.4.5 Under no circumstances shall the Contractor's Work proceed prior to preparatory Work proceed prior to preparatory Work having been completely cured, dried and/or otherwise made satisfactory to receive this Work. Responsibility for timely installation of all materials rests solely with the Contractor responsible for that Work, who shall maintain coordination at all times.

3.4.6 The Contractor shall make reasonable efforts to only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall also use reasonable efforts to minimize the likelihood of any strike, work stoppage, or other labor disturbance.

3.4.7 In case the progress of the Work is affected by any undue delay in furnishing or installing any items, materials or equipment required under the Contract Documents because of such conflict involving any such labor agreement or regulation, the Owner may require that other items, materials or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive.

3.5 WARRANTY

Add the following Paragraphs:

3.5.1 The Contractor will warrant all materials and workmanship against original defects, except injury from proper and usual wear when used for the purpose intended, for one year after Acceptance by the Owner, and will maintain all items in condition that conforms with the Contract Documents during the period of warranty.

3.5.2 Non-conforming work during the period of warranty will be corrected by the Contractor at its expense upon demand of the Owner, it being required that the Work conforms to the Contract Documents at the expiration of the warranty period.

3.5.3 In addition to the General Warranty there are other warranties required for certain items for different periods of time than the one year as above, and are particularly so stated in that part of the specifications referring to same. The said warranties will commence at the same time as the General Warranty.

3.5.4 If the Contractor fails to remedy any failure, defect or damage within a reasonable time after receipt of notice, the Owner will have the right to replace, repair, or otherwise remedy the failure, defect or damage at the Contractor's expense.

3.5.5 The Contractor agrees to assign to the Owner at the time of final completion of the Work any and all manufacturers' warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturers' warranties.

3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

3.7.1 Delete the second sentence and substitute the following new sentence:

"The Contractor shall secure, pay for, and, as soon as practicable, furnish the Owner, Construction Manager and Architect with copies and/or certificates of all 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.

3.7.3 Deleted in its entirety and replace with the following: "If the Contractor, any of its Subcontractors or any Sub-subcontractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor, any of its Subcontractors or any Sub-subcontractor shall assume appropriate responsibility for such Work and shall bear the costs, damages, losses, expenses of every kind, including reasonable attorneys' fees, attributable to correction."

Add the following Paragraph:

3.7.6 No separate inspection performed or failed to be performed by the Owner, Construction Manager or Architect hereunder shall be a waiver of any of the Contractor's obligations hereunder or be construed as an approval or acceptance of the Work or any part thereof.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

Add the following Paragraphs:

3.10.5 The schedule shall indicate the proposed starting and completion dates for the various subdivisions of the Work as well as the totality of the Work. The schedule shall be updated every thirty (30) days and submitted to Architect with Contractor's Applications for Payment. Each schedule shall contain a comparison of actual progress with the estimated progress for such point in time stated in the original schedule. If any schedule submitted sets forth a date for Substantial Completion for the Work or any phase of the Work beyond the Date(s) of Substantial Completion established in the Contract (as the same may be extended as provided in the Contract Document(s), the Contractor shall submit to Owner and Architect for their information and to the Construction Manager for its review and approval, a narrative description of the means and methods which Contractor intends to employ to expedite the progress of the Work to ensure timely completion of the various phases of the Work as well as the totality of the Work. To ensure such timely completion, Contractor shall take all necessary action including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Corrective Measures"). In that event, Contractor is required to implement Corrective Measures, then Contractor shall not be entitled to an adjustment in the Contract Sum, the Schedule or the Contract Time. The date of final completion shall not be changed without the written consent of the Owner.

3.10.6 The construction schedule shall be in a detailed precedence-style critical path management ("CPM") or primavera-type format satisfactory to the Construction Manager and Architect that shall also (i) provide a graphic representation of all

activities and events that will occur during performance of the Work; (ii) identify each phase of construction and occupancy; and (iii) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates").

3.10.7 In the event the Construction Manager and/or Architect determine that the performance of the Work, as of a Milestone Date, has not progressed or reached the level of completion required by the Contract Documents, the Construction Manager shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, implementing Corrective Measures. Such Corrective Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Construction Manager's right to require Corrective Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule.

3.10.8 The Contractor shall not be entitled to an adjustment in the Contract Sum or Contract Time in connection with Extraordinary Measures required by the Construction Manager under or pursuant to this Section 3.10.

3.10.9 The Construction Manager may exercise the rights furnished the Construction Manager under or pursuant to this Section 3.10 as frequently as the Construction Manager deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date(s) set forth in the Contract Documents.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following Paragraphs:

3.11.1 During the course of the Work, the Contractor shall maintain a record set of drawings on which the Contractor shall mark the actual physical location of all piping, valves, equipment, conduit, outlets, access panels, controls, actuators, including all appurtenances that will be concealed once construction is complete, etc., including all invert elevations.

3.11.2 At the completion of the Project, the Contractor shall obtain a set of reproducible drawings from the Architect, and neatly transfer all information outlined in 3.11.1 to provide a complete record of the as-built conditions.

3.11.3 The Contractor shall provide two (2) prints of the as-built conditions, along with the reproducible drawings themselves, to the Owner and one (1) set to the Architect. In addition, attach one complete set to each of the Operating and Maintenance Instructions/Manuals.

3.17 In the second sentence of the paragraph, insert "indemnify and" between "shall" and "hold".

ARTICLE 4: ARCHITECT AND CONSTRUCTION MANAGER

4.1 General
4.1.2 Insert "As required by law," at the beginning of the first sentence.

4.2 Administration of the Contract

Delete the first sentence of Paragraph 4.2.10 and replace with the following:

The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples for the purpose of checking for conformance with the Contract Documents.

Delete the second sentence of Paragraph 4.2.10 and replace with the following:

The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work in the activities of the Owner, Contractor or separate Contractors, while allowing sufficient time in the Owner's professional judgment to permit adequate review.

Add the following to Paragraph 4.2.16:

There will be no full-time project representative provided by the Owner or Architect on this project.

Add to Paragraph 4.2.19 "and in compliance with all applicable codes, regulations and ordinances." to the end of the sentence.

ARTICLE 5: SUBCONTRACTORS

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

Delete Paragraph 5.2.3 in its entirety and replace with the following:

5.2.3 If the Owner, Architect or Construction Manager has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Architect or Construction Manager has no reasonable objection, subject to the statutory requirements of 29 Delaware Code § 6962(d)(10)b.3 and 4.

Add the following new Paragraph:

5.2.5 Upon written request, the Contractor shall provide to the Owner and Construction Manager an executed copy of all subcontracts, purchase orders and other agreements relating to the Work.

5.3 SUBCONTRACTOR RELATIONS

Add the following new Paragraphs:

5.3.1 All subcontracts shall be in writing and shall specifically provide that the Owner is an intended third-party beneficiary of such subcontract. Each subcontract shall contain a contingent assignment of the subcontract to the Owner consistent with Section 5.4

5.3.2 The Contractor shall be responsible for any and all Subcontractors working under it and shall carry insurance for all Subcontractors or ensure that they are carrying it themselves so as to relieve the Owner of any and all liability to be covered by insurance.

ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

Delete Paragraph 6.1.3 in its entirety and replace with the following:

"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 Constructor who executes each separate Owner-Contractor Agreement."

6.2 MUTUAL RESPONSIBILITY

6.2.3 In the second sentence, strike the word "shall" and insert the word "may".

ARTICLE 7: CHANGES IN THE WORK

(SEE ARTICLE 7: CHANGES IN WORK IN THE GENERAL REQUIREMENTS)

7.1.3 Insert the following sentence at the end of the existing sentence: "Except as permitted in Section 7.3, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order."

Add the following new Paragraphs:

7.1.4 A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time and the Contractor shall have no claim therefor unless it shall, prior to complying with same and in no event later than ten (10) working days from the date such direction or order was given, submit to the Owner, Construction Manager and Architect for the Architect's and Construction Manager's evaluation and Owner's approval of its change proposal.

7.1.5 When submitting any proposal for Changes in the Work, the Contractor shall include and set forth in clear and precise detail breakdowns of labor and materials for all trades involved for the estimated impact on the construction schedule. If request, the Contractor shall furnish spreadsheets of any Subcontractors.

7.2 CHANGE ORDERS

Add the following new Paragraph 7.2.1 – Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule, including the Contract Time.

ARTICLE 8: TIME

8.2 PROGRESS AND COMPLETION

Add the following Paragraphs:

8.2.1.1 Refer to Specification Section SUMMARY OF WORK for Contract time requirements.

8.2.4 If the Work falls behind the Progress Schedule as submitted by the Contractor, the Contractor shall employ additional labor and/or equipment necessary to bring the Work into compliance with the Progress Schedule at no additional cost to the Owner.

8.3 DELAYS AND EXTENSION OF TIME

8.3.1 Strike "arbitration" and insert "remedies at law or in equity".

Add the following Paragraph:

8.3.2.1 The Contractor shall update the status of the suspension, delay, or interruption of the Work with each Application for Payment. (The Contractor shall report the termination of such cause immediately upon the termination thereof.) Failure to comply with this procedure shall constitute a waiver for any claim for adjustment of time or price based upon said cause.

Delete Paragraph 8.3.3 in its entirety and replace with the following:

8.3.3 Except in the case of a suspension of the Work directed by the Owner, an extension of time under the provisions of Paragraph 8.3.1 shall be the Contractor's sole remedy in the progress of the Work and there shall be no payment or compensation to the Contractor for any expense or damage resulting from the delay.

Add the following Paragraph:

8.3.4 By permitting the Contractor to work after the expired time for completion of the project, the Owner does not waive its rights under the Contract.

8.3.5 The parties agree that Paragraph 8.3.3 of the Supplementary General Conditions does not apply to the Construction Manager in the event of a delay caused by a party other than the Construction Manager.

ARTICLE 9: PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add the following Paragraphs:

9.2.1 The Schedule of Values shall be submitted using AIA Document G702, Continuation Sheet to G703.

9.3 APPLICATIONS FOR PAYMENT

Add the following Paragraph:

9.3.1.3 Application for Payment shall be submitted on AIA Document G702 "Application and Certificate for Payment", supported by AIA Document G703 "Continuation Sheet". Said Applications shall be fully executed and notarized.

Add the following Paragraphs:

9.3.4 Until Closeout Documents have been received and outstanding items completed the Owner will pay 95% (ninety-five percent) of the amount due the Contractor on account of progress payments.

9.3.5 The Contractor shall provide a current and updated Progress Schedule to the Architect with each Application for Payment. Failure to provide Schedule will be just cause for rejection of Application for Payment.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Add the following to 9.5.1:

.8 failure to provide a current Progress Schedule;
.9 a lien or attachment is filed;
.10 failure to comply with mandatory requirements for maintaining Record Documents.
.11 reasonable evidence that the Work has not progressed as indicated on the Application for Payment; or
.12 otherwise is responsible for a substantial and material breach of a provision of the Contract Documents.

Add the following Paragraph:

9.5.4 If the Contractor disputes any determination by the Construction Manager or the Architect made in accordance with the foregoing with regard to any Certificate of Payment, the Contractor nevertheless shall expeditiously continue to prosecute the Work.

9.6 PROGRESS PAYMENTS

Delete Paragraph 9.6.1 in its entirety and replace with the following:

9.6.1 After the Architect and the Construction Manager have approved and issued a Certificate for Payment, payment shall be made by the Owner within 30 days after Owner's receipt of the Certificate for Payment.

Add the following Paragraph:

9.6.2.1 Notwithstanding anything in Section 9.6.2 to the contrary, in the event the Construction Manager has reasonable cause to believe a Subcontractor is not being paid by the Contractor, the Construction Manager may elect to make any payment requested by the Contractor on behalf of a Subcontractor of any tier jointly payable to the Contractor and such Subcontractor, provided that in the event the Contractor disputes the sum due to the Subcontractor, Construction Manager shall only pay the sum not disputed by the Contractor, provided that the Contractor provides satisfactory assurance such as a bond to Owner with respect to payment of the disputed sum. The Contractor and such Subcontractor shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint payment be construed to create any (i) contract between the Owner and a Subcontractor of any tier, (ii) obligations from the Owner to such Subcontractor, or (iii) rights in such Subcontractor against the Owner.

9.7 FAILURE OF PAYMENT

In first sentence, strike the first reference to "seven" and insert "thirty (30)". Also strike "binding dispute resolution" and insert "remedies at law or in equity" and add the following at the end of the Paragraph: "Notwithstanding the preceding sentence, the Contractor shall not stop the Work during the pendency of a bona fide dispute between the Owner and the Contractor, provided any sums in dispute claimed by the Contractor are placed in escrow and Owner agrees to pay said disputed sum in accordance with the resolution of the dispute.

Add the following Paragraph:

9.7.1 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

9.8 SUBSTANTIAL COMPLETION

9.8.5 In the second sentence, strike "shall" and insert "may".

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Add the following Paragraphs:

10.1.1 Each Contractor shall develop a safety program in accordance with the Occupational Safety and Health Act of 1970. A copy of said plan shall be furnished to the Owner, Construction Manager and Architect prior to the commencement of that Contractor's Work.

10.1.2 Each Contractor shall appoint a Safety Representative. Safety Representatives shall be someone who is on site on a full time basis. If deemed necessary by the Owner, Construction Manager or Architect, Contractor Safety meetings will be scheduled. The attendance of all Safety Representatives will be required. Minutes will be recorded of said meetings by the Contractor and will be distributed to all parties as well as posted in all job offices/trailers etc.

10.2 SAFETY OF PERSONS AND PROPERTY

Add the following Paragraph:

10.2.4.1 As required in the Hazardous Chemical Act of June 1984, all vendors supplying any material that may be defined as hazardous must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a caution warning on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in foreseeable emergency situations. Material Safety Data Sheets shall be provided directly to the Owner, along with the shipping slips that include those products.

10.3 HAZARDOUS MATERIALS

Delete Paragraph 10.3.3 in its entirety.

Delete Paragraphs 10.3.6 in its entirety.

ARTICLE 11: INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.4 Strike "the Owner" immediately following "(1)" and strike "and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations."

Add the following Paragraph:

11.1.5 If the Contractor fails to purchase or maintain or require to be purchased or maintained the liability insurance specified in the Contract Documents, the Owner may (but shall not be obligated to) purchase such insurance on the Contractor's behalf and shall be entitled to be repaid for any premiums paid therefor by Contractor in the manner set forth in Section 2.4 and/or as provided in Section 9.7.2, at Owner's election.

11.2 OWNER'S LIABILITY INSURANCE

Delete Paragraph 11.2 in its entirety.

11.3 PROPERTY INSURANCE

Delete Paragraph 11.3 and its subparagraphs in their entirety and replace with the following:

11.3 The Owner will not provide Builder's All Risk Insurance for the Project. The Contractor and all Subcontractors shall provide property coverage for their tools and equipment, as necessary. Any mandatory deductible required by the Contractor's Insurance shall be the responsibility of the Contractor.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 Add the following sentence: "The bonds will conform to those forms approved by the Office of Management and Budget."

Add the following new Paragraph:

11.4.3 If any Surety hereunder makes any assignment for the benefit of creditors, or commits any act of bankruptcy, or is declared bankrupt, or files a voluntary petition in bankruptcy, or in the reasonable opinion of the Owner is insolvent, the Contractor shall immediately furnish and maintain another Surety in accordance with the provisions of this Section 11.4 satisfactory to the Owner.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.2.2 AFTER SUBSTANTIAL COMPLETION

12.2.2 Add the following sentence at the end of the existing paragraph:

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

Add the following Paragraph:

12.2.2.1.1 At any time during the progress of the Work, or in any case where the nature of the defects will be such that it is not expedient to have corrected, the Owner, at its option, will have the right to deduct such sum, or sums, of money from the amount of the Contract as determined by the Architect in consultation with the Construction Manager and adjust the difference in value between the defective work and that required under Contract including any damage to the structure.

12.2.2.2 Strike "one" and insert "two".

12.2.2.3 Strike "one" and insert "two".

12.2.5 In second sentence, strike "one" and insert "two".

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Strike "except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4."

Insert "except that, if the parties have selected arbitration as the method of dispute resolution, the Delaware Arbitration Act, 10 Del. C. §5701, shall govern Section 15.4."

13.6 INTEREST

Strike "the date payment is due at such rate as the parties may 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." Insert "30 days of presentment of the authorized Certificate of Payment at the annual rate of 12% or 1% per month.

13.7 TIME LIMITS ON CLAIMS

Strike the last sentence.

Add the following Paragraph:

13.8 CONFLICTS WITH FEDERAL STATUTES OR REGULATIONS

13.8.1 If any provision, specifications or requirement of the Contract Documents conflict or is inconsistent with any statute, law or regulation of the government of the United State of America, the Contractor shall notify the Architect, Construction Manager and Owner immediately upon discovery.

Add the following Paragraph:

13.9 "GENERAL PROVISIONS – All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall include the plural and vice versa. Titles of articles, Sections and Sections are for convenience only and neither limit nor amplify the provisions of this Contract in itself. The use herein of the word "including", when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such words as "without limitation", or "but not limited to", or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term or matter.

Wherever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed severable.

Each party hereto agrees to do all acts and things and to make, execute and deliver such written instruments, as shall from time to time be reasonably required to carry out the terms and provisions of the Contract Documents.

Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate, or limit any responsibilities or obligations of a subcontractor of any tier under the Contract Documents or the applicable subcontract.

Contractor makes the following representations:

1. Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, locality, local conditions, and with Federal, State and Local Laws, ordinances, rules and regulations that may in any manner effect costs, progress or performance of the Work.

2. Contractor has made examinations, investigations, tests and studies at the project site, as he deems necessary for the performance of the Work at the Contract Price and within the Contract Time. Contractor has correlated the results of all such observations, examinations, tests, reports and data with the terms and conditions of the other Contract Documents.

3. Contractor has given the Architect written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by the Architect is acceptable to the Contractor."

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT

Add the following additional Paragraphs to 14.1.1:

.5 disregards the instruction of the Construction Manager or Architect when such instructions are based on the requirements of the Contract Documents.

.6 fails to furnish the Owner and Construction Manager with assurances satisfactory to the Owner and Construction Manager evidencing the Contractor's ability to complete the Work in compliance with the requirements of the Contract Documents.

.7 fails or neglects to progress work in such a manner to reasonably assure completion of the Work within the Contract Time or in accordance with the Construction Schedule.

.8 purposefully engages in a strike or work stoppage, or is in any way responsible for hindering or delaying the work of other trades, or ceases to work due to picketing or labor disputes of any kind.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

Delete Paragraph 14.4.3 in its entirety and replace with the following:

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and cost incurred by reason of such termination along with reasonable overhead.

ARTICLE 15: CLAIMS AND DISPUTES

15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

Delete Paragraph 15.1.6 and its subparagraphs in their entirety.

15.2 INITIAL DECISION

Delete Paragraph 15.2.5 in its entirety and replace with the following:

15.2.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be subject to mediation and other remedies at law or in equity.

Delete Paragraph 15.2.6 and its subparagraphs in their entirety.

15.3 MEDIATION

15.3.1 Strike "binding dispute resolution" and insert "any or all remedies at law or in equity".

15.3.2 In the first sentence, delete "administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedure in effect on the date of the Agreement,". Also strike "binding dispute resolution" and insert "remedies at law and in equity".

15.4 ARBITRATION

Delete Paragraph 15.4 and its subparagraphs in their entirety.

END OF SUPPLEMENTARY GENERAL CONDITIONS

SECTION 007343 – WAGE RATE REQUIREMENTS

1. SUMMARY

1.1. In accordance with Delaware Code, Title 29, Chapter 69, Section 6912, all laborers and mechanics of the Contractor and all subcontractors employed to perform work directly upon the site of the work shall be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account the full amounts accrued at the time of payment computed at wage rates not less than those determined by the Division of Industrial Affairs, Department of Labor, State of Delaware, as the prevailing rates in this area.

1.2 This approved scale of wages must be posted by the Contractor in a prominent and easily accessible place at the site of the work.

1.3 It is further stipulated that there may be withheld from the Contractor such accrued payment as may be considered necessary by the contracting officer to pay laborers and mechanics employed by the Contractor or any subcontractors on the work the difference between the rates of wages required and the rate of wages received by such laborers and mechanics and not refunded to the Contractor, subcontractor or their agents.

1.4 Where wage rates are published in this Manual they are issued by the State Department of Labor on the date indicated and are included for the convenience of Bidders. The Owner, the Architect, and the Construction Manager, accept no responsibility for the accuracy or applicability of any rates included herein. The actual wage rate determinations which will apply to the work will be those in effect on the first day of public advertisement for bids as determined by the State Department of Labor. It will be the responsibility of each bidder to contact the State Department of Labor and to incorporate these rates in his bid.

1.5 "In accordance with Delaware Code, Title 29, Section 6912, as amended July 5, 1994, contractors shall furnish sworn payroll information to the Department of Labor on a weekly basis for each contract which exceeds $15,000 for renovation work and $100,000 for new construction. The construction contract amount is based on a cumulative total of all contracts bid for a specific project. Payroll forms for submission may be obtained from the Department of Labor."

1.5.1 A Payroll Report, available from the Department of Labor is to be used to provide this information.

1.6 A copy of the Prevailing Wages for the project is attached hereto.

END OF SECTION

Red Clay Consolidated School District
Wilmington Campus Renovations
Bid Pack 'A'
April 15, 2013

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **BUILDING CONSTRUCTION** EFFECTIVE MARCH 15, 2013

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	21.87	26.94	39.20
BOILERMAKERS	65.47	33.22	48.83
BRICKLAYERS	46.83	46.83	46.83
CARPENTERS	50.06	50.06	39.82
CEMENT FINISHERS	27.61	29.11	21.20
ELECTRICAL LINE WORKERS	43.49	37.29	28.44
ELECTRICIANS	60.60	60.60	60.60
ELEVATOR CONSTRUCTORS	75.33	40.93	30.55
GLAZIERS	64.10	64.10	54.20
INSULATORS	51.48	51.48	51.48
IRON WORKERS	59.12	59.12	59.12
LABORERS	38.30	38.30	38.30
MILLWRIGHTS	62.18	62.18	48.75
PAINTERS	42.02	42.02	42.02
PILEDRIVERS	67.87	37.64	30.45
PLASTERERS	28.55	28.55	17.50
PLUMBERS/PIPEFITTERS/STEAMFITTERS	59.00	49.26	46.28
POWER EQUIPMENT OPERATORS	57.06	57.06	24.13
ROOFERS-COMPOSITION	21.77	17.96	19.34
ROOFERS-SHINGLE/SLATE/TILE	17.59	17.50	16.45
SHEET METAL WORKERS	62.74	62.74	62.74
SOFT FLOOR LAYERS	45.97	45.97	45.97
SPRINKLER FITTERS	51.75	51.75	51.75
TERRAZZO/MARBLE/TILE FNRS	51.41	51.41	45.45
TERRAZZO/MARBLE/TILE STRS	59.03	59.03	52.63
TRUCK DRIVERS	26.88	23.89	20.03

CERTIFIED: 3/19/13

BY: [signature] for
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: Wilmington Campus Renovations, New Castle County

SECTION 101100 - SUMMARY OF WORK

1. RELATED DOCUMENTS

1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Sections, apply to work of this Section.

2. CONTRACTS

2.1 The work will be performed under separate prime contracts managed by the Construction Manager.

3. ALTERATIONS & COORDINATION

3.1 Contractor shall be responsible to coordinate their work with the work of others, including, but not limited to, the preparation of general coordination drawings, diagrams and schedules, and control of site utilization, from the beginning of activity, through project close-out and warranty periods.

4. KNOWLEDGE OF CONTRACT REQUIREMENTS

4.1 The Contractor and his Subcontractors, Sub-subcontractors and material men shall consult in detail the Contract Documents for instructions and requirements pertaining to the Work, and at his and their cost, shall provide all labor, materials, equipment and services necessary to furnish, install and complete the work in strict conformance with all provisions thereof.

4.2 The Contractor will be held to have examined the site of the Work prior to submitting his proposal and informed himself, his Subcontractors, Sub-subcontractors and material men of all existing conditions affecting the execution of the Work.

4.3 The Contractor will be held to have examined the Contract Documents and modifications thereto, as they may affect subdivisions of the Work and informed himself, his Subcontractors, Sub-subcontractors and material men of all conditions thereof affecting the execution of the Work.

4.4 The Scope of Work for the Contract is not necessarily limited to the description of each section of the Specifications and the illustrations shown on the Drawings. Include all minor items not expressly indicated in the Contract Documents, or as might be found necessary as a result of field conditions, in order to complete the Work as it is intended, without any gaps between the various subdivisions of work.

4.5 The Contractor will be held to be thoroughly familiar with all conditions affecting labor in the area of the Project including, but not limited to, Unions, incentive pay, procurements,

living, parking and commuting conditions and to have informed his Subcontractors and Sub-subcontractors thereof.

5. CONTRACT DOCUMENTS INFORMATION

5.1 The Contract Documents are prepared in accordance with available information as to existing conditions and locations. If, during construction, conditions are revealed at variance with the Contract Documents, notify the Construction Manager immediately, but no more than three (3) days from the day the variance is first known. Failure to give timely notice shall operate to waive any claim Contractor might otherwise have for an adjustment to Contract Time or Sum as a consequence of such variance.

5.2 The Specifications determine the kinds and methods of installation of the various materials, the Drawings establish the quantities, dimensions and details of materials, the schedules on the Drawings give the location, type and extent of the materials.

5.3 Dimensions given on the Drawings govern scale measurements and large scale drawings govern small scale drawings, except as to anything omitted unless such omission is expressly noted on the large scale drawings.

5.4 The techniques or methods of specifying to record requirements varies throughout text, and may include “prescriptive”, “open generic/descriptive”, “compliance with standards”, “performance”, “proprietary”, or a combination of these. The methods used for specifying one unit of work has no bearing on requirements for another unit of work.

5.5 Whenever a material, article or piece of equipment is referred to in the singular number in the Contract Documents, it shall be the same as referring to it in the plural. As many such materials, articles or pieces of equipment shall be provided as are required to complete the Work.

5.6 Whenever a material, article or piece of equipment is specified by reference to a governmental, trade association of similar standard, it shall comply with the requirements of the latest publication thereof and amendments thereto in effect on the bid date.

5.7 In addition to the requirements of the Contract Documents, Contractor’s work shall also comply with applicable standards of the construction industry and those industry standards are made a part of Contract Documents by reference, as if copied directly into Contract Documents, or as if published copies were bound herein.

5.8 Where compliance with two (2) or more industry standards, contract requirements, or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, then the most stringent requirements, which are generally recognized to be also the most costly, is intended and will be enforced, unless specifically detailed language written into the Contract

Documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently equal but different requirements, and uncertainties as to which level of quality is more stringent, to Architect for decision before proceeding.

5.9 Reference standards referenced directly in Contract Documents or by governing regulations have precedence over non-reference standards which are recognized in industry for applicability of work.

5.10 Contractor's bid is based on the complete set of Contract Documents including documents not specifically issued as part of the bid pack but referenced in same.

6. SCOPE OF WORK/GENERAL INFORMATION

6.1 A Scope of Work for each contract to be awarded on the project follows in this section. When a Contract has been awarded to a Contractor, the successful Contractor will be listed after the title of the Contract. When no Contract has yet been awarded, no Contractor's name will be listed. Previous Scopes of Work include addendum changes.

6.2 Contractor is responsible for performing the work listed in the Summary of Work for his contract. Contractor is also responsible for knowing the work that has been assigned to preceding contracts. No additional compensation or extension of time will be allowed a Contractor due to his ignorance of the work assigned to his Contract or to other contracts which may affect his work. The Contractor is responsible, however, for all items which are covered in the Specifications and Drawings relating to their Contract if not specifically mentioned in the Summary of Work.

6.3 The Construction Manager will provide on site a source for temporary electric, temporary water and portable sanitation facilities only. It is each Contractor's responsibility to make the necessary connections, including all material for temporary electric and water. Please note that utility charges for office trailers will be the responsibility of the individual Contractors.

6.4 A dumpster will be provided on site for free use by Contractors to dispose of non-hazardous, common, work-related refuse. Clean-up is the responsibility of each Contractor. Clean up shall be performed on a daily basis. Contractors not complying will be advised in writing and back charged for all costs associated with the clean up of their work.

6.5 Contractors are reminded that there are limited storage areas available on site. Off site storage will be the responsibility of each individual Contractor.

6.6 Office trailer permits off site will be the responsibility of each individual Contractor. On site Contractor's field offices, one (1) per Contractor, if required, will be located as directed by the Construction Manager.

6.7 Contractor will be prepared to discuss and submit a detailed project schedule seven (7) days after receipt of Notice to Proceed and to begin its submittal process. The Project Schedule is an integral part of this contract. Certain construction sequences and priorities must take place in order to meet the target dates. Concentrated work periods will occur and each Contractor is responsible to staff the project as required by the current Construction Schedule or as directed by the Construction Manager. Contractor will cooperate with the Construction Manager in planning and meeting the required sequences of work and Project Schedule as periodically updated by the Construction Manager.

6.8 All bids must include insurance limits in accordance with Article 11 of the Section 007300 SUPPLEMENTARY CONDITIONS.

6.9 Hoisting, scaffolding and material handling is the responsibility of each Contractor, unless otherwise noted.

6.10 Contractor will be responsible for layout of its own work. The Construction Manager will provide benchmark and layout of the building line.

6.11 Contractor will be responsible to keep clean public roadways soiled by construction traffic on a daily basis. If cleaning is not done, the Construction Manager may perform the cleaning on an overtime basis and backcharge the Contractor responsible.

6.12 Contractor Scopes of Work and Schedule are interrelated. Familiarity with each is required.

6.13 The Construction Manager will provide testing services for soil, concrete and steel. Other testing as required by the Contract Documents will be in accordance with the technical specifications and/or the individual scope of work. Refer to Specification Section 004500 - QUALITY CONTROL.

6.14 Safety is the responsibility of each individual Contractor. The project will be governed under the guidelines of OSHA.

6.15 Inter-Contractor shop drawing distribution will be performed by the Construction Manager. Contractor is individually responsible for either coordinating his work with these distributed drawings or notifying the Construction Manager, in writing, of any discrepancies.

6.16 Coordination with other trades will be required. The Contractor will be required to attend periodic coordination meetings with other trades where requirements, conflicts and coordination issues will be discussed and resolved. Attendance when requested will be mandatory. If inter-Contractor coordination is not satisfactorily performed, the

conflicting Contractors shall mutually share the cost to relocate and/or reinstall their work.

6.17 Contractor shall submit a schedule of values to the Construction Manager prior to the submission of their first invoice for approval on AIA G702/CMa, Application for Payment and G703, Continuation Sheet.

6.18 Contractor is expected to review and coordinate its Work with the complete set of Contract Documents, including all items noted as by his trade whether or not shown on that particular set of drawings. Documents are available at the site for review.

6.19 Contractor is responsible for obtaining all necessary permits required for his work, including street permits. Unless otherwise noted, building permit shall be secured by the Construction Manager. Any subcontractor who will be restricting access to street, right of way or adjacent property must notify the Construction Manager 48 hours in advance.

6.20 Contractor's License: Submit a copy of all business licenses required by local and state agencies.

6.21 Contractor shall absorb, without additional compensation, any and all costs of working beyond normal hours to maintain job progress in accordance with the current construction schedule.

6.22 No asbestos or PCB's in or on any material or equipment will be accepted or allowed on this project. All hazardous materials will be treated in accordance with all State and Federal regulations.

6.23 Daily clean up of the work is the responsibility of each individual Contractor which includes broom cleaning of their debris as required. Contractor will be individually back charged by the Construction Manager for clean up not satisfactorily performed by the Contractor.

6.24 In the event asbestos is uncovered, the Contractor shall notify the Construction Manager of the areas requiring removal of asbestos. The Construction Manager shall then coordinate the removal with the Owner.

6.25 This project is to be constructed adjacent to and in existing buildings. Contractor shall exercise all due precautions to minimize noise, air pollution and any other construction hazards which in any way would cause discomfort or danger to the occupants of the existing building in the area.

6.26 Existing mechanical, electrical, plumbing, sprinkler, medical gas, fire alarm, etc. systems will be shut off and locked out by the Owner as required by the Work. Tie-in's and

modifications to those systems will be performed by the specific Contractor associated with the work as indicated in the Contract Documents. Re-energizing and re-start up of all systems should be performed by the Owner.

6.27 The Safety Cable System shall not be altered or removed without a written request submitted to the Project Manager with a copy to the Field Manager. It shall be the responsibility of each and every Contractor that is removing or altering the Safety Cable System to maintain the fall protection safety provided by the safety cable and not leave the area unprotected. Each and every Contractor shall be responsible to re-install the Safety Cable System immediately after work is completed. Each and every Contractor shall be responsible to re-install the Safety Cable System in accordance to OSHA standards.

6.28 Normal work hours for this project are from 7:00 a.m. to 3:30 p.m. Any work to be performed outside of these hours must receive prior approval from the Construction Manager. Requests to work beyond normal work hours shall be submitted at least 48 hours prior.

6.29 Contractor is responsible for having a competent project superintendent/foreman on-site during all work performed under its contract.

6.30 In the event the Contractor has non-English speaking employees or subcontractors on the project, they shall have a superintendent or foreman on site, at all times, who speaks English and can communicate with Contractor's employees. Should the Contractor fail to meet this requirement, at any time, Construction Manager may direct all Work to stop until the proper supervision is on site. The Contractor will be responsible for maintaining the project work schedule and make up at its own expense, any delay to the Schedule resulting from the work stoppage.

6.31 Punch List Procedures: Contractor shall be given a copy of the punch list with his appropriate work identified. Contractor shall have nine (9) calendar work days to complete its punch list work. On the 10th day or as determined by the Construction Manager, the Construction Manager shall employ other contractors, as required, to complete any incomplete punch list work and retain from the appropriate Contractors retainage all costs incurred.

6.32 Contractor shall provide the necessary safety barricades and railings required to complete their work and comply with all OSHA, local code and contract specifications.

6.33 **Liquidated Damages:** Contractors are responsible to provide sufficient manpower and equipment and materials to complete work as shown in the project schedule. Any delays in completing a phase of work due to issues caused by a contractor will be subject to a penalty of $2,000 per calendar day that the work is not completed following the scheduled completion date of that phase of work.

CONTRACT NO. A-1 FIRE PROTECTION

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 07 90 05	Joint Sealers
Division 21	Fire Suppression
Division 22	Plumbing
Division 23	HVAC
Division 26	Electrical

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide a complete sprinkler system in accordance with NFPA 13
- This contractor's price shall include a complete sprinkler system in accordance with Bid Pack A & B.
- Demolition of existing fire sprinkler system as shown on drawing FP/P-101, FP/P-102, FP-102 and FP/P-103.
- Contractor will be required to furnish necessary dumpsters for materials to be demolished including the removal from site and proper disposal.
- Provide piping, fittings, couplings, valves and sprinkler heads.
- As-built drawings.
- Concrete equipment pads, curbs and thrust blocks for fire protection work.
- Testing and inspections.
- Cutting and patching.
- Firesafing.
- Design.

- Flow and tamper switches to be supplied by this Contractor and wired by the Electrical Contractor. It is this Contractors responsibility to provide flow and tamper switches to meet applicable state and local codes.

- Fire pump, controller and related work. Wiring of pump and controller to be by the Electrical Contractor.

- Meter, if required, and all applicable fees.

- Pipe identification.

- Provide soffi-steel enclosure.

- Provide the necessary coordination with trades to avoid interferences with other work and make corrections at no extra charge.

- Provide in the base bid $5,000 allowance for work as directed by the Construction Manager. All unused portions of the allowance will be returned at the end of the project.

- Work shall be performed during the summer of 2013 and summer of 2014. Contractor shall price accordingly.

- The Carpentry & General Works Contractor shall remove the acoustical ceiling tiles for the demolition and installation of the sprinkler pipe. This contractor shall provide a 2 week look ahead schedule of the areas requiring removal.

- Extra Stock. For each style and temperature range required, furnish additional sprinkler heads, amounting to 1unit for every 100 installed units.

CONTRACT NO. A-2 ELEVATORS

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 14	Conveying Equipment
Division 21	Fire Suppression
Division 22	Plumbing
Division 23	HVAC
Division 26	Electrical

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Remove Elevator Cab & Provide New.
- Work on the existing elevator will occur during the Summer of 2014.
- Remove elevator relay control
- Remove elevator hoist machine.
- Remove elevator cables.
- Remove travelling cable wiring.
- Remove door panels & operators.
- Remove hall call station.
- Provide new elevator microprocessor control.
- Provide new elevator hoist machine w/ alternating current drive.
- Provide elevator cables.
- Provide travelling cable wiring.
- Provide door panels & operators.

- Provide hall call station.
- Provide Elevator Cab Plywood subfloor.
- Provide stainless steel handrail.
- Provide plastic laminate wall panels.
- Provide elevator car operating panel.
- Provide elevator car indicator.
- Provide elevator car riding direction lantern.
- Provide cove lighting.
- Provide cab fan.
- Provide emergency exit panel.
- Provide stainless steel wall panels.
- Provide base vents.
- Provide stainless steel ceiling panels.
- Grouting of all elevator sill angles.
- Contractor will be required to furnish necessary dumpsters for materials to be demolished including the removal from site and proper disposal.
- This Contractor to furnish and install all rough wiring necessary for the installation of emergency telephones. All communication devices will be furnished and installed by the Owner.

CONTRACT NO. A-3 CARPENTRY AND GENERAL WORK

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 03 30 00	Cast-In-Place Concrete
Section 04 20 00	Unit Masonry
Section 06 10 00	Rough Carpentry
Section 06 20 00	Finish Carpentry
Section 07 90 05	Joint Sealers
Section 08 11 13	Hollow Metal Doors and Frames
Section 08 71 01	Door Hardware
Section 08 80 00	Glazing
Section 09 05 61	Common Work Results for Flooring Preparation
Section 09 21 16	Gypsum Board Assemblies
Section 09 90 00	Tiling
Section 09 51 00	Acoustical Ceilings
Section 09 65 00	Resilient Flooring
Section 09 90 00	Painting & Coating
Section 10 21 13.19	Solid Composite Toilet Compartments
Section 10 28 00	Toilet and Bath Accessories
Division 22	Plumbing
Division 26	Electrical

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

Selective Demolition

- Provide all labor, material, trucking, equipment, hoisting, scaffolding, power, temporary facilities, permit fees, supervision, layout, clean up, etc. for the complete performance of all selective demolition work in the toilet rooms.

- Contractor will be required to furnish necessary dumpsters for materials to be demolished including the removal from site and proper disposal.

- Contractor will be required to provide adequate control of dust and debris during selective

demolition.

- Remove from site all combustible material including, but not limited to wood, steel, iron, structural steel, and dispose of in a legal manner. No on site burning of material will be allowed at any time.

- Remove from site concrete slabs on grade, retaining walls (concrete and masonry) in a legal manner.

- Items of demolition shall include, but not necessarily be limited to, complete structures, wall framing, masonry walls, structural steel, interior partitions, mechanical and electrical equipment and fixtures, and related equipment.

- This contractor shall remove the mechanical and plumbing systems in the Toilet Rooms. This contractor shall coordinate the removal of mechanical and plumbing systems with the Mechanical & Plumbing contractor prior to demolition. Mechanical & Plumbing contractor shall identify and safe off all systems scheduled to be removed.

- Remove all oil and fuel storage tanks that are located within the structure in accordance will all City, State and Federal regulations.

- This Contractor shall notify the Construction Manager immediately if hazardous materials (i.e. asbestos, lead, PCB's, etc.) are uncovered. At that time, all work in the affected area will be stopped until proper removal can be completed by others (i.e. hazardous material abatement contractor).

- Temporary maintenance standby labor such as for temporary water, temporary power, temporary light and the like where required due to this Contractor's work is to be included within the Contract Price.

- This Project is to be constructed adjacent to existing buildings. The Contractor shall exercise all due precautions to minimize noise, air pollution and any other construction hazards which in any way would cause discomfort or danger to the occupants of the existing buildings in the area.

- This Contractor shall clean public streets and sidewalks daily. This Contractor shall collect and remove from the site daily all rubbish, scrap and other debris resulting from its operations.

- This Contractor shall comply with all Federal, State and local laws requiring noise control and hours which work is to be conducted. Mufflers, "whisperized" compressors, etc., shall be used as required for compliance with laws and ordinances throughout the course of the Work.

- It is understood that all Work under this Contract shall be in strict accordance with the Building Code with the City, State and any other agency having jurisdiction. In the event of any conflict in any provisions of any regulatory agency and Contract Documents, the more stringent requirements shall apply.

- This Contractor is aware of the structural capacities of various portions of the structure. Cranes, materials, deliveries and material storage, shall not exceed rated capacities without this Contractor taking appropriate steps to compensate for the imposition of loads which may exceed the design criteria and which are imposed solely by this Contractor's operations.

- This Contractor shall provide any and all "fire watch" personnel required due to the Contractor's cutting, burning, welding or other open flame activity.

- This Contractor shall submit proposed methods and operations of building demolition to the Owner, his representative or agents for review prior to the start of work, including a schedule of coordinating the shut off, capping and/or continuation of utility services as required.

- This Contractor shall visit the site of the proposed work, fully acquaint and familiarize himself with the conditions as they exist and the character of the operations to be carried out under the proposed Contract, and make such investigation as he may see fit so that he shall fully understand the facilities, physical conditions and restrictions affecting the work under the Contract. Claims for additional compensation and/or extensions of time because of Contractor's failure to familiarize himself with all conditions which might affect the work shall not be allowed.

- This Contractor, before commencement of any part of the Work, shall give any notices, required to be given to an adjoining landowner and other parties.

- This Contractor, in the performance of the Work under his subcontractor, shall maintain all required means of egress from the existing buildings and alter such stairs, platforms and fire escapes as required to satisfy all agencies having jurisdiction.

- Before demolition work is started, existing sewer, water, gas, electric, and other services in the existing buildings shall be shut off, disconnected and capped or plugged in accordance with the requirements of the utility companies or other authorities having jurisdiction. Contractor will use licensed mechanics to perform this work. This Contractor shall notify all such authorities in advance and obtain their approval and cooperation in shutting off utilities. All costs in connection with disconnecting utilities shall be borne by this Contractor.

- This Contractor shall provide shoring and bracing to stabilize and protect existing structures.

- Existing services to remain will be defined by the Owner prior to or immediately after the start of demolition work.

- Miscellaneous equipment and furnishings belonging to the Owner, if to be retained by the Owner, will be removed before the commencement of the demolition work. All other equipment or furnishings attached, remaining, in the building at the start of the demolition work shall be protected by this Contractor.

- All equipment, materials and debris shall be regularly removed by this Contractor from the Site as work progresses in such manner as not to create a nuisance, and shall be disposed of by this Contractor at his own expense, at locations to be determined by this Contractor. Permits required in connection with the disposal of the materials shall be obtained by this Contractor. Disposal shall be in accordance with all Federal, State and local laws, rules, codes, orders and regulations.

- Materials and equipment to be salvaged or which have been sold to others by this Contractor must be promptly removed by this Contractor, and shall not be stored at the site. The offering, advertising, display or sale of materials and equipment will not be permitted.

- Contractor shall remove debris promptly and will not burn anything on the site. Contractor shall keep required fire extinguishing equipment in serviceable condition, properly distributed so that it will be available for immediate use, particularly during any acetylene cutting operations. This Contractor shall afford adequate facilities for inspection by, and carry out the recommendations of, the local Fire Department. This Contractor shall maintain one fire riser during demolition.

- This Contractor shall, prior to the start of Work, provide the name and location of proposed dump site to receive the demolition debris. Dump site must be licensed and acceptable to all local government agencies having jurisdiction.

- This Contractor shall provide signed and stamped dump site debris tickets identifying the location, date, time and quantity of debris deposited at the dump site.

- Provide in the base bid $10,000 allowance for work as directed by the Construction Manager. All unused portions of the allowance will be returned at the end of the project.

- The selective demolition work associated with the fire sprinkler system, shown on drawings FP-100, FP-101, FP-102 and FP-103 is shown for reference only. This work IS NOT part of this contract. This work will be performed by the Fire Protection Contractor. However the demolition contractor is responsible for protecting the existing fire protection system while performing their work.

- This contractor shall provide Masonite floor protection for their path of travel from the area of work being performed to the outside of the building.
- Demolition in Toilet Rooms.
- Remove ceramic tile floor & mud base.
- Remove ceramic wall tile.
- Remove toilet accessories.
- Remove toilet partitions.
- Remove plumbing fixtures.
- Remove radiators and covers.
- Remove wall grilles.
- Remove acoustical ceiling and grid.
- Remove lighting.
- Remove concrete slab.
- Remove hollow metal door & frame per Demo Key Note H / A-421.

Cast In Place Concrete

- Provide 4" concrete slab with vapor barrier over 4" drainage fill per General Sheet Notes 6 / A-411.
- Provide control joint at new slab along foundation wall condition.
- Provide #4's at 24" OC, 18" long with 9" embed into existing slab.
- This Contractor will be responsible for laying out all concrete work.
- This Contractor to furnish and install reinforcing steel, admixtures, curing compound, sealers as required in the Contract Documents.
- Placement of related items furnished under other specification sections.
- All blockouts and embedments required by plans and specifications.

- All concrete testing will be completed by the Construction Manager, however, it will be the responsibility of this Contractor to furnish all samples.

- Provide specified sloping for floor drains/trenches as detailed (Drains to be furnished by Mechanical Contractor).

- This Contractor shall include the finishing of concrete slabs around all floor penetrations throughout the floor slab areas. These penetrations will consist of electrical boxes, stubbed conduits, mechanical piping and electrical and technology conduit stubs, etc.

- This Contractor shall provide written documentation that all concrete slabs are within the tolerance required by the contract documents. Testing and analysis to be paid for by this Contractor.

Masonry

- Provide new CMU Partitions.

- Provide masonry infill and rigid insulation at removed radiator locations.

- Provide concrete masonry units, mortar and grout, reinforcing steel, masonry joint reinforcement, ties and anchors, embedded flashing, miscellaneous masonry accessories, and related work.

- Provide integral masonry flashings, expansion joints, insulation and other related items as required.

- Remove louver, saw cut and remove masonry for new heat pump in the Elevator Penthouse. Coordinate with Mechanical Contractor size and location.

- Grouting of door frames at masonry openings.

- Scaffolding as required to complete the work.

- Layout of the work including responsibility for all elevations and dimensions as they affect other Contractor's work.

- Provide masonry lintels where ductwork passes through new CMU walls. This Contractor will review the mechanical, plumbing and electrical drawings to determine the quantity and location of lintels that will be required where these utilities pass through masonry walls. This Contractor will coordinate with the Mechanical, Plumbing and Electrical Contractors to establish the layout and elevations before installing lintels.

- Fill at hollow concrete masonry units.
- Temporary protection for final wash down/cleaning of masonry.
- Cutting, fitting and building into masonry work.
- Provide all firesafing and fire caulking as required. Work related to masonry work.
- Grout all CMU blocks where supplemental steel brace and angles are to be attached to the CMU walls. The exact location must be coordinated with the Structural Steel Contractor.
- The Masonry Subcontractor will be responsible for the disposal of masonry debris offsite.
- Grout solid the existing CMU jambs where new door frames are to be installed.

Rough Carpentry / Finish Carpentry

- Provide labor and materials to perform the work related to all carpentry and general work.
- Provide all rough carpentry related to the exterior skin of the building including wood nailers, blocking, plywood, rooftop equipment bases and support curbs, etc. including fire treating, as required.
- Provide all rough carpentry related to the interior of the building including blocking, wood nailers, plywood, etc. for the installation of fire extinguishers, doors, windows, toilet accessories, cabinets, toilet partitions, casework, millwork, etc. including fire treating, as required.
- Repair all fireproofing damaged during removal / installation of material by this contractor.
- All field trimming required to adjust to existing conditions.
- Provide caulk between the millwork and trim and the adjacent surfaces.
- Provide caulk between new door frames and existing openings. Refer to Section 07 90 05 Joint Sealers.
- Provide ½ glass hollow metal door, frame & hardware at elevator penthouse.
- Steel doors and frames and glazing including receipt of doors and frames at the curb side.
- Provide finish hardware related to all doors including receipt of hardware at the curb side.

- Expedite the shops, fabrication, and delivery of the hollow metal door frames. These frames shall be shipped early in the project in order to maintain the schedule.
- Provide permanent cores matching existing & keyway.
- This contractor is responsible for all field measurements required to retrofit frames and/or doors in existing openings.
- Provide 48 hour notice prior to delivery. All deliveries are to be between 7:00 AM and 3:30 PM.
- All field trimming required to adjust to existing conditions.
- Provide Solid Surface Panels. Refer to detail C4 / A-412.
- Provide solid composite toilet compartments.
- Toilet and bath accessories.
- Coordinate cutting holes in casework with other trades.
- Provide Mirrors.

Gyp Brd Assemblies

- Remove bottom of soffit, modify framing, and provide 5/8" gypsum board, finish and paint. Provide new access panels. Refer to dwg A-102. Provide wall and floor protection at area of soffit removal.
- Provide metal studs, insulation, gypsum wallboard, taping, and spackling.
- Provide plaster patch around standpipe penetrations – prime patch as per Sheet Keynote 3 on dwg. A-101, A-102 & A-103.
- Provide ceiling joist framing.
- Provide secondary support framing.
- Access panel installation (assume 10 total).
- Provide scaffolding and lifts for this work.
- Comebacks and out-of-sequence work will be required and as such should be included.

- Include all necessary field measurements.

Ceramic Tile / Rubber Flooring

- Provide flooring in accordance with the finish schedule and specifications.
- Prepare subfloor for finished flooring including leveling and patching. Base bid shall include all flashing, patching, and surface preparation required to perform the work of this Contractor.
- Provide porcelain floor tile, wall tile, base, metal edge strips, and grout.
- Provide concrete floor slab crack isolation membrane.
- Provide grout sealant.
- Verify that sub floor surfaces are smooth and flat within the tolerance specified for that tyope of work and are ready to receive tile.
- Verify concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity.
- Provide cleaning and protection for ceramic tile. Protection will be with reinforced kraft paper, cardboard, or masonite.
- Provide cutting and fitting around work of others.
- Provide skim coating of CMU in order to prepare the new or existing walls to receive ceramic tile.
- Provide rubber flooring in elevator cab per elevator cab key notes 1 /A-421. Elevator contractor shall provide the subfloor.

Paint

- Provide labor and materials to perform the work related to all paining.

Acoustical Ceilings

- Provide acoustical panel ceilings, suspension system and hangers.
- Provide supplemental suspension hangers at large ducts above ceilings and at openings for lighting fixtures.

- Provide continuous acoustical sealant on back of vertical leg before installing moldings.

- This Contractor shall cut openings in ceilings for sprinkler heads, lights, mechanical diffusers and grilles, etc.

General

- This Subcontractor shall at a minimum provide and maintain for the length of the project, one temporary fire extinguisher for each 3,000 sq. ft of the protected building area. Fire extinguishers shall be 10lb, Multi-Purpose (ABC) dry chemical, UL labeled, with a rating of 3a:40bc.

- Remove / Store / Reinstall ceiling tile & grid as required for the removal and installation of the sprinkler system.

- Remove / Store / Reinstall ceiling tile & grid as required for the Pool Pak supplemental steel installation.

- Fire Protection work shall be performed during the summer of 2013 and summer of 2014. This contractor shall price the removal of the acoustical ceiling accordingly.

- This contractor shall support all light fixtures, diffusers etc. where ceiling grid is being removed and placed back in kind during reinstallation of the ceiling grid.

- Provide plaster patch per Keynote 3A as indicated on Dwg A-101, A-102 & A-103.

- Repair all fireproofing damaged during removal / installation of material by this contractor.

- Provide 45 degree concrete cant on existing concrete beam in Elevator Penthouse. Refer to New Key Note 11 / A-421.

Electrical

- This Contractor will hire a licensed electrical subcontractor to provide complete electrical systems in the Toilet Rooms as indicated on the drawings, schedules and in the specifications.

- This Contractor is responsible for all of the Electrical Construction Notes on drawing E-101 associated with the Toilet Rooms.

- Temporary electric installation, maintenance and removal. Refer to Division 1, specification section 015113 - TEMPORARY ELECTRIC, for specific scope.

- Electrical permits, testing and inspections.
- All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.
- Hoisting, rigging and scaffolding.
- As-built drawings.

CONTRACT NO. A-4 MECHANICAL & PLUMBING – POOL PAK

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
07 90 05	Joint Sealers
Division 22	Plumbing
Division 23	Mechanical
Division 26	Electrical

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide a complete mechanical, plumbing and piping system as indicated on the Drawings and in the Specifications.

- Provide all labor, material, trucking, equipment, hoisting, scaffolding, power, temporary facilities, permit fees, supervision, layout, clean up, etc. for the complete performance of all selective demolition work.

- Contractor will be required to furnish necessary dumpsters for materials to be demolished including the removal from site and proper disposal.

- Division 26 of the specifications should be reviewed as it relates to the power wiring and other requirements for HVAC equipment including the coordination of furnishing and installing motor starters as provided in the specifications.

- This Contractor shall be responsible to designate an individual within his organization, intimately familiar with this project and assigned on site, to act as the System Start-up Coordinator. This individual must be pre-approved by the Construction Manager. This individual's responsibilities shall include, but not be limited to, coordinating the start-up of all mechanical equipment, including the coordination between the Electrical Contractor, the Controls Contractor, and all testing, adjusting and balancing work. This individual shall report on a weekly basis, in written form, to the Construction Manager. These reports shall include a summary of current conditions including manufacturers' start-ups, systems' deficiencies noted to date and the remediation of same, coordination issues between trades, system interfacing and forecasting, as necessary to project the completion of each individual system within the building.

- Penetrations through wall, floors, etc. including cutting, patching and fire safing.
- Repair all fireproofing damaged during removal / installation of material by this contractor.
- Remove and dispose of Natatorium AHU Unit and all associated components.
- Remove exhaust riser, fan on roof and controls completely. Cap existing curb air tight.
- Equipment bases and housekeeping pads.
- Permits/meters.
- Excavation and backfill for underground mechanical/plumbing work is the responsibility of this Contractor.
- Pipe and duct insulation.
- Install duct detectors furnished by the electrical contractor.
- Penetrations through wall, floors, etc. including cutting, patching and fire safing.
- Clean up.
- All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.
- Hoisting, rigging and scaffolding.
- ATC.
- Ductwork, flex duct, grilles and diffusers.
- Louvers and vents related to HVAC operations.
- Joint Sealants for this contractors work.
- Coordinate damper size, location and type of damper with architectural drawings.
- Gas piping, meter and pressure regulator valve.
- Roof curbs.
- Install Owner prepurchased equipment, if applicable.

- Provide Sump Pump.
- Access panels directly associated with this contractors work.
- Repair all fireproofing damaged during removal / installation of material by this contractor.
- This contractor shall identify, cut and cap all mechanical and plumbing systems associated with the demolition of the Toilet Rooms. The Carpentry & General Work Contractor shall remove the mechanical & plumbing systems in the Toilet Rooms as identified by this Contractor.
- As-built drawings.

SECTION 012100 - ALLOWANCES

1. RELATED DOCUMENTS

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

1.3 Refer to Scope Information Sheets for all contracts bound in the Project Manual under Section 011100 - SUMMARY OF WORK. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

1.4 For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

1.5 Include in the Contract Sum all lump sum and unit cost allowances stated in the Contract Documents.

1.6 Designate in the construction progress schedule the delivery dates for products specified under each allowance.

1.7 Designate in the Schedule of Values the quantities of materials required under each unit cost allowance.

2. ALLOWANCES FOR PRODUCTS

2.1 The amount of each allowance includes:

A. The cost of the product or labor to the Contractor or Subcontractor, less any applicable trade discounts.

B. Delivery to the site.

C. Labor required under the allowance, only when labor in specified to be included in the allowance. If labor is not specified to be included in the allowance, it shall be included in the Contractor's bid and in the resulting Contract Sum.

D. Applicable taxes.

E. Profit and overhead.

2.2 In addition to the amount of each allowance, include in the Contract Sum the Contractor's costs for:

A. Handling at the site; including unloading, uncrating and storage.

B. Protection from the elements and from damage.

C. Labor for installation and finishing, except where labor is specified to be a part of the allowance.

D. Other expenses required to complete the installation.

E. Contractor's and Subcontractor's overhead and profit.

2.3 Refer to Scope Information Sheets under Section 011100 - SUMMARY OF WORK for the amount of each lump sum allowance and for work specified in the specification sections listed below.

A. A-1 Fire Protection

B. A-3 Carpentry & General Work

3. ADJUSTMENT OF COSTS

3.1 Should the net cost be more or less than the specified amount of the allowance, the Contract Sum will be adjusted accordingly by Change Order.

A. For products and labor specified under a unit cost allowance, the unit cost shall apply to the quantities actually used with a nominal allowance for waste, as determined by receipted invoices, or by field measurement.

3.2 At Contract closeout, reflect all approved changes in Contract amounts in the final statement of accounting.

END OF SECTION

SECTION 012200 - UNIT PRICES

1. GENERAL PROVISIONS

1.1 The general provision of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

1.3 For work being constructed under separate prime contract, provisions of this Section apply to each contract being bid.

2. BASE BID

2.1 The Base Bid shall consist of all work shown or specified in the Contract Documents, exclusive of any Additive Unit Prices specified herein.

.2.2 The Base Bid shall include all work in any Subtractive Unit Prices specified herein.

3. UNIT PRICES

3.1 State in the Bid Form the amount to be added to (or subtracted from) the Base Bid per unit of measurement for each Unit Price specified. State this amount to include all overhead and profit. No surcharge in addition to the Unit Price listed will be permitted.

3.2 See Section 002113, INSTRUCTIONS TO BIDDERS for related information.

3.3 For description of Unit Prices requested, refer to the specification. The method of stating the Unit Prices is described in the Bid Form.

3.4 Where both add and deduct unit prices are requested, there shall not be more that a 10% variation between the two.

4. APPLICATION OF UNIT PRICES

4.1 Unit prices stated in the Bid Form will apply from the time the Bid is submitted until Contract completion.

5. MEASUREMENT OF QUANTITIES

5.1 Quantities shall be determined by field measurement by contractor personnel and as verified by the Construction Manager.

5.2 At the Contractor's option, and at his expense, measurement may be made by a registered surveyor.

6. LIST AND DESCRIPTION OF UNIT PRICES

6.1 **Unit Price No. 1:** Price per square foot to remove and reinstall the existing acoustical ceiling grid and tiles. This price includes the removal and storage of the existing grid, supporting of existing electrical, mechanical, fire alarm, fire sprinkler, speaker, etc.; preparation of the existing surfaces, and all required grid anchors and accessories.

END OF SECTION

SECTION 012300 - ALTERNATES

1. GENERAL PROVISIONS

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Refer to provisions in AIA Document A232 – 2009 Edition, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

1.3 For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

2. BASE BID

2.1 The Base Bid shall consist of all work shown or specified in the Contract Documents, exclusive of any Additive Alternates specified herein.

2.2 The Base Bid shall include all work in any Subtractive Alternates specified herein.

3. ALTERNATES

3.1 State in the Bid Form the amount to be added to the Base Bid for each Alternate specified.

3.2 See Section 002113 - INSTRUCTIONS TO BIDDERS for related information.

3.3 The description of Alternates contained herein is in summary form. Detailed requirements for materials and execution shall be as specified in other sections and as shown on drawings.

Alternate No. 1: Sprinklers in Black Box

a. Base Bid: No work is required.
b. Alternate: Includes, but is not limited to, Add sprinklers in Tool / Paint Storage – 51, Black Box – 54 and Scene Shop 67.

Alternate No. 2: Elevator to the Lighting Booth

a. Base Bid: No work is required.
b. Alternate: Includes, but is not limited to, Add elevator adjacent to Ticket Booth 244 at the back of the Theater.

END OF SECTION

SECTION 012600 - CHANGE ORDER PROCEDURES

1. GENERAL:

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

1.3 The Construction Manager is responsible for processing all change orders. Each request will be assigned a change order request (COR) number. The Change Order Request & Execution Form will be initiated via the web-based project management system (Building Blok) used by the CM.

1.4 It is to be clearly understood that no extra work shall commence without an approved written and executed change order from the Owner.

2. INITIATING A CHANGE ORDER:

2.1 Specific changes initiated by the Owner, Architect, Construction Manager (CM) or Contractor will be processed as follows:

A. The Owner will authorize the Architect to prepare sufficient documents to establish an accurate price. These documents to be forwarded to the Construction Manager and Owner "for pricing only, not authorized for construction." The Construction Manager will develop the estimate (within 2 weeks) showing a breakdown by trades with all trade contractor quotes. The Owner will approve or reject the change request within two (2) weeks. If the Owner elects to proceed with the change, the Construction Manager will prepare formal change orders to the various trade contractors involved in the change and reference in all formal change orders the original change order request number.

B. Field Change: Contractor shall immediately notify the Construction Manager of a change due to field conditions or site conditions. If documents cannot be prepared for pricing due to schedule constraints, the Construction Manager will make every effort in estimating the field change. If the Owner and Construction Manager agree that certain field changes should be handled on a time and material basis, the Construction Manager will closely monitor the Contractor's labor and material affecting this change. At the completion of the work a formal change order will be issued.

C. Contractor Change: If a Contractor initiates a change order for work not included in the Contract, the Construction Manager and Architect will research the validity of

the request, verify quantities and pricing and submit to the Owner for approval on a change order request.

2.2 The additional cost, or credit to the Owner resulting from a change in the Work shall be by mutual agreement of the Owner, Contractor, Construction Manager and the Architect.

3. PROCESSING A CHANGE ORDER:

3.1 The Contractor will fill in the Change Order Request & Execution Form (COREF) with a brief description of the change, any time extension, and cost changes.

3.2 The Contractor will attach to the COREF copies of the written quotations from the trade contractors, Contractors, and suppliers. The Labor Detail Sheet and the Change Order Detail forms must be added as an attachment to the COREF. The Contractor and each sub-tier contractor (as applicable) must fill out the Labor Detail Sheet and Change Order Detail Sheet. Samples of these forms are attached.

3.3 In all cases, this cost or credit shall be based on the "DPE" wages required and the "invoice price" of the materials/equipment needed.

3.4 "DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes direct salary plus customary fringe benefits (prevailing wage rates) and documented statutory costs such as workman's compensation insurance, FICA, and unemployment insurance.

A. "Fringe Benefit" is any medical, life or disability insurance, paid time off, etc.

B. "Worker's Compensation" is the insurance required for injuries including medical leave, etc.

C. "FICA" is the costs association with Social Security and Medicare insurance.

D. "Unemployment insurance" is the cost associated with the governmental assessment for employee's unemployment benefits.

3.5 "Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and/or equipment that is paid by the Contractor (or Subcontractor) to a material distributor, direct factory vendor, store, material provider, or equipment leasing entity.

3.6 In addition to the above, the Contractor is allowed markup for overhead and profit on additional work performed as outlined in Specification Section 012613, Contractor Compensation.

3.7 Building Blok Procedures: The Contractor will submit all change order requests and

supporting documentation via the Building Blok web-based project management system. Each Contractor will be issued a unique login and password. Each contractor must submit the information as follows:

A. Create a new change order, from your "To-Do List" by clicking on the "Create Issue" tab in the upper right corner and select "Change Order Request".
B. The Contractor will enter a brief description of the change in the "Summary" block. A detailed description of the change will be entered in the "Description of Change" block, to include any changes to documents or time extension. The cost of the change will be entered in the "Total Cost Change" block.

C. The Labor Detail Sheet and the Change Order Detail forms must be added as an attachment to the request. The Contractor and each sub-tier contractor (as applicable) must fill out the Labor Detail Sheet and Change Order Detail Sheet. Samples of these forms are included behind this section. In addition to these forms, the Contractor also must attach any material and equipment rental quotations. All of these documents should be scanned and saved as a PDF file. Click on the "Browse" box to upload the file. Be sure to wait until Building Blok tells you the file was "Uploaded Successfully".

D. Once the information is entered on the form and the proper attachments are uploaded, the contractor will click "Save". The Contractor will be prompted to enter their password to approve an electronic signature. Once you save the request you will have an opportunity to check it before submitting it to the CM. After you verify the COREF is correct click "Recommend Approval" to submit the change request to the CM. The Contractor will then be prompted to re-enter the password to approve an electronic signature and complete the submission request. Click on "Home" in the upper left corner to make sure the change order does not appear on your To-Do List.

E. The Change Order Request will then be reviewed by the CM Project Manager and Recommended for Approval, Rejected, or returned to the Contractor for additional information. Once the Construction Manager, Owner, and Architect have approved the request all parties will receive an email from Building Blok notifying them that a fully executed Change Order and Contract Recalculation Form can be downloaded from Building Blok. Hard copies of the executed change order and recalculation form will not be provided by the CM.

It is to be clearly stated that no extra work shall commence without an approval from the Owner or Construction Manager or Owner's representative.

END OF SECTION

CHANGE ORDER REQUEST & EXECUTION FORM

110 South Poplar Street
Suite 400
Wilmington, DE 19801

Tel. 302-421-5700
Fax 302-421-5715

DATE:	PROJECT NAME:
CONTRACT:	REQUEST NUMBER:
CONTRACTOR:	CHANGE ORDER NUMBER:
	STATE PO NUMBER:

The following is a summary of the request submitted by the contractor as described above. All supporting documents have been attached and described herewith. This summary shall contain a total amount of compensation requested by the contractor as well as any request for an extension in contract time. It shall be understood that the amounts described below shall remain valid for a period of sixty days from the date described above unless otherwise stated.

A detailed breakdown of Labor, material, equipment, and subcontract costs must be attached to be considered for review.

1. Summary Description(s):
2. Changes to the Contract Drawings:
3. Changes to the Project Manual:
4. Total Cost Change:
5. Total Time Change:

REVIEWED

This request has been reviewed and____approval_____disapproval is recommended by:

Name Title Date

APPROVED

This change order request is not approved until executed by all parties bound by a contractual relationship. Upon execution it shall represent a modification to the agreement and is subject to all terms and conditions of the contract documents.

Contractor:	Architect:
Signed By:	Signed By:
Title:	Title:
Date:	Date:
EDiS Company	Owner:
Signed By:	Signed By:
Title:	Title:
Date:	Date:

CHANGE ORDER DETAIL FORM

(Provided by contractor, subcontractor or sub tier contractor)

DATE SUBMITTED:

CONTRACT:

CONTRACTOR:

PROJECT NAME: WILMINGTON CAMPUS RENOVATIONS

CHANGE ORDER REQUEST #:

LABOR SECTION

TRADESMAN(s):	LABOR HOURS	RATE (per schedule)	SUBTOTAL
Subtotal			

MATERIAL SECTION

MATERIAL:	QUANTITY	UNIT COST	SUBTOTAL
Subtotal			

EQUIPMENT SECTION

EQUIPMENT:	QUANTITY	UNIT COST	SUBTOTAL
Subtotal			

SUBTOTAL	
SUBCONTRACTOR/ SUB TIER*	
OH & PROFIT (10% on sub/sub tier only))	
BOND COST	
OH & PROFIT (15% on own work)	
GRAND TOTAL	

LABOR DETAIL FORM

(Provided by contractor, subcontractor, or sub-tier contractor)

DATE:

CONTRACT:

CONTRACTOR:

PROJECT NAME: WILMINGTON CAMPUS RENOVATIONS

CHANGE ORDER REQUEST #:

CLASSIFICATION:			
Base Wage Rate:			
Health Insurance			
Holidays			
Sick Days			
Life Insurance			
Disability Insurance			
Dental Insurance			
Company Vehicle			
401K			
Education			
Other (*specify below*)			
Subtotal			
Posted Prevailing Rate			
FICA (Social Security & Medicare)			
SUTA (State Unemployment)			
FUTA (Federal Unemployment)			
General Liability Insurance			
Worker's Compensation			
Total Wage Rate			

3/2012

SECTION 012613 - CONTRACTOR COMPENSATION

1. GENERAL

1.1 The Contractor agrees to perform any additional Work, for the net cost of materials and labor (including wages paid, payroll taxes, and all insurance) plus the following percentage for all of his overhead and profit, which includes Field Supervision:

The percentages to be added or allowed for any Work change involving both added Work and omitted Work shall be applied only to the net difference in cost.

(a) 15% mark-up (10% overhead and 5% profit) by the Contractor on Work performed by his own forces.

(b) For work done by a Subcontractor, 10% for subcontractor overhead and 5% for subcontractor profit to which the Contractor may add 7.5% for his overhead and profit combined.

(c) Contractor mark-up shall include supervision, home and field overhead, all self-owned small tools and equipment.

1.2 When the Contractor is directed to perform overtime work at the CM (Owner) expense to accelerate contractual work, the cost for same shall only be the actual premium costs incurred by the Contractor.

END OF SECTION

SECTION 012900 - PAYMENT PROCEDURES

1. GENERAL PROVISIONS

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Refer to provisions in AIA Document A232 - 2009 Edition, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

1.3 For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

2. REQUIREMENTS INCLUDED

2.1 Submit Applications for Payment to Construction Manager in accordance with the schedule and procedures established in the Contract Documents.

3. RELATED REQUIREMENTS

3.1 Owner-Contractor Agreement.

3.2 Conditions of the Contract: Article 9 PAYMENTS AND COMPLETION.

3.3 Section 01 31 13: Project Coordination Meetings

3.4 Section 01 33 00: Submittal Procedures

3.5 Section 01 77 00: Closeout Procedures

4. FORMAT AND DATA REQUIRED

4.1 Submit itemized applications typed on AIA Document G702/CMa, Application and Certificate for Payment, and Continuation Sheet G703, examples of which will be furnished to the Contractor at the Pre-Construction meeting.

4.2 Provide itemized data on Continuation Sheet:

1. Format, schedules, line items and values: Duplicates of those of the schedule of values previously accepted by the Construction Manager.

5. PREPARATION OF APPLICATIONS FOR PROGRESS PAYMENTS

5.1 Form: AIA Document G702/CMa

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated on Continuation Sheets.

5.2 Continuation Sheets:

1. Line items of components of Work will be subject to Owner's review and approval under the Provisions of Section 013300 - SUBMITTALS, and the General Conditions. Continuation Sheets shall follow Schedule of Values submitted at the start of the job.

2. Fill in total list of all scheduled components of Work, with item number and scheduled dollar value for each item. Fill in values of work completed in the period.

3. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored; round off values to nearest dollar.

4. List each Change Order executed prior to date of submission, at the end of the Continuation Sheets; list by Change Order Number, and description, as for an original component item of work.

6. PREPARATION OF APPLICATION FOR FINAL PAYMENT

6.1 Fill in Application form as specified in progress payments.

7. SUBMITTAL PROCEDURES

7.1 Complete Invoice:

1. Submit completed Application to the Construction Manager by the date stipulated in the Project Manual.

7.2 Number: Submit 3 copies of each invoice.

END OF SECTION

SECTION 013113 - PROJECT COORDINATION MEETING

1. PROJECT COORDINATION MEETING

1.1 An on-site project coordination meeting will be held on a biweekly basis throughout the project construction period.

2. ATTENDANCE

2.1 Attendance at the project coordination meeting is mandatory of each Contractor or major supplier on the project.

2.2 The representative of the Contractor shall be the Project Manager and field superintendent, unless a substitute representative has been approved by the Construction Manager.

2.3 Contractor will begin attending the Project Coordination Meetings at least 4 weeks prior to mobilization on site, and will continue until the Contractor has fulfilled the obligations of his Contract.

2.4 EDiS will prepare meeting minutes and distribute them to all of the contractors. Each contractor is required to review the meeting minutes and follow-up on items assigned. Each contractor will be responsible for disseminating information discussed during these meetings to their field personnel, subcontractors, and suppliers.

3. AGENDA

3.1 The Construction Manager will set the agenda for the biweekly Project Coordination Meeting.

3.2 At a minimum, the Contractor shall be prepared to discuss the following:

1. Actual vs. as planned progress for the prior two week period.

2. Planned construction activities for the next four weeks.

3. Contract document clarifications.

4. Coordination items with other contractors.

5. Quality Control.

6. Recently issued change orders.

7. Potential change orders.

8. Submittals and shop drawings.

9. Requests for Information (RFI's).

10. Other items requiring Construction Manager's attention.

END OF SECTION

SECTION 013119 – PRE-INSTALLATION MEETINGS

1. PRE-INSTALLATION MEETINGS

1.1 An on-site pre-installation meeting will be held at least two weeks prior to commencement of installation of work.

2. ATTENDANCE

2.1 Attendance at the pre-installation meeting is mandatory of each Contractor and/or major supplier as required for each specific meeting listed below.

2.2 The following individuals shall attend these meetings:
- Contractors' Project Manager
- Contractors' Field Superintendent
- Contractors' Safety Representative (as needed)
- Key Subcontractors, Suppliers, and Vendors
- EDiS Project Manager
- EDiS Field Manager
- EDiS Safety Director (as needed)
- EDiS MEP Specialist (as needed)
- Owner's Representative (as needed)
- Architect/Engineer (as needed)
- Governmental Agency Representatives (as needed)
- Testing/Inspection Agency Representatives (as needed)
- Utility Company Representatives (as needed)

3. SUBMITTALS

3.1 Each contractor is responsible to have all submittals and mock-ups, as related to the pre-installation meeting scope of work, submitted and approved prior to commencement of the pre-installation meeting.

4. LIST OF REQUIRED MEETINGS

- Structural Steel Erection & Miscellaneous Metals OSHA mandated Safety Meeting
- Roofing OSHA mandated Safety Meeting
- Building Envelope
  - Exterior Structural Stud Assembly
  - Masonry & Stone
  - Curtain Wall/Glazing/Storefronts
- Doors/Frames/Hardware
- Interior Glass and Glazing
- Finish Carpentry & Millwork
- Acoustical Ceilings/Acoustical Wall Panels

- Paint and VWC
- Ceramic Tile
- Flooring (VCT, Carpet)
- Terrazzo Flooring
- Elevators
- Partition Walls
    - Metal Studs
    - Drywall
    - Insulation
    - Doors/Frames/Hardware
- Elevators
- Fire Protection
    - Fire Sprinkler Systems
- MEP Coordination
    - Mechanical Piping Roughin
    - Plumbing Roughin
    - Insulation
    - Electrical Roughin
    - Electrical – Bonding, grounding, lightning protection
    - Automatic Temperature Controls
    - Commissioning
- Voice/Data Low Voltage Wiring
- Security System
- Audio-Visual Equipment
- Owner Furnished Equipment
- Final Cleaning

5. AGENDA

5.1 At a minimum, the Contractor shall be prepared to discuss the items as listed on the agenda template shown on the following page:

PROJECT: WILMINGTON CAMPUS RENOVATIONS

PRE-INSTALLATION MEETING: (Insert Phase of Work)

A. INTRODUCTIONS

B. REVIEW SCOPES OF WORK

C. REVIEW CONTRACT DRAWINGS AND SPECIFICATIONS

D. REVIEW SUBMITTALS

E. TESTING & INSPECTION REQUIREMENTS

F. REVIEW RELEVANT RFI'S OR DESIGN BULLETINS

G. REVIEW MATERIALS AND DELIVERIES

H. REVIEW SCHEDULE AND SEQUENCE OF WORK

I. JOB SITE SAFETY

J. COORDINATION WITH OTHER TRADES

K. CLOSEOUT

L. ACTION ITEMS AND RESPONSIBILITY

END OF SECTION

SECTION 013125– WEB-BASED PROJECT MANAGEMENT SYSTEM

1. GENERAL PROVISIONS

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Refer to provisions in AIA Document A201 – 2007 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, for requirements in addition to those specified in Division 1.

1.3 Refer to Scope Information Sheets for all contracts bound in the Project Manual under Section 011100 - SUMMARY OF WORK. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

1.4 All Contractors shall use Internet/Web-based project management software to transmit documents, track, and otherwise manage this project.

1.5 Use of this project management software will not change any contractual responsibilities of the construction team members.

2. DEFINITIONS

2.1 System: A real time web-based software that shares data, translates data, organizes data, facilitates communication, archives actions, and offers scheduling prompts to identified Users.

2.2 Users: Authorized participants of this project furnished with a unique password and authorized to access the system to view/input/export data. Owner, Construction Manager, Architect, and the Contractors are all Users. Other Users may be added as necessary.

2.3 Contacts: Entities identified to automatically receive specific transmissions or entities selected to receive specific information sent by the system through to an e-mail address.

2.4 Signees: Those individuals identified, by the Contractors, authorized to sign change orders and payment applications via electronic signature. This electronic signature is as contractually binding as an original signature on paper.

3. USE OF SYSTEM

3.1 The use of the system is mandatory for the documentation of the transmittal of all non-oral information, even if the actual transmission of the information is by another means.

3.2 The use of the system will be mandatory by the Contractors to send, retrieve, and respond to

data.

3.3 In addition to this web-based project management system, the Contractors will be required to use electronic mail (email) for day-to-day communication and correspondence. Email will be the primary means of transmitting written communication (i.e. meeting minutes, draft pay applications, etc.).

4. QUALITY ASSURANCE

4.1 A three hour training session in the use of the software for this project will be offered by the Construction Manager at a location convenient to the project site. Attendance by one member of each Contractor's organization is mandatory. Additional attendees may enroll based on availability of training space. All attendees must have a working knowledge of computers. Training can not begin until three working days after the receipt of the submittals indicated below.

4.2 Technical assistance will be provided by on-line help, email, or telephone for all Users throughout the life of the project.

5. SUBMITTALS

5.1 Submit to the Construction Manager, within 5 days following the receipt of the letter of intent to award, in an electronic template, the following:

a. Electronic logo of organization (as needed)
b. Names, mailing address and electronic address of its Users and Contacts.
c. Designation the role/responsibility for each User

6. SOFTWARE AND HARDWARE REQUIREMENTS

6.1 Each User shall provide and maintain a computer with high speed internet access and an email address. The computer shall have a high speed internet browser (Internet Explorer 8.0 or higher, Firefox version 3.6.12 or higher, Google Chrome or Safari version 5.0 or higher) and a high speed cable Internet access, high speed DSL or T1 line.

6.2 License(s) to Use System - Each Contractor will be provided unlimited licenses to use the system for this project. Each license will allow secure unlimited usage from the notice to proceed until the original contract completion date.

7. SYSTEM DESCRIPTION

7.1 The web based project management system is a "secure, real-time, interactive, centralized database" specifically established and maintained for the management of this construction project. The product is designed to facilitate communication and improve the time management

of its users by facilitating the sharing of information. Information will be available 24/7, from any computer meeting the specifications listed above. The information is fully protected. The electronic platform allows information to be transmitted across the internet reducing printing and postage costs and the time associated with such activities.

7.2 The system contains a directory of the project participants.

7.3 The system includes templates, with the CM's letterhead, for each document created inside the system. The template allows the use of "pull down" menus to complete significant portions of each document.

7.4 The system allows the templates (and attached documents created outside the system) to be distributed to Users and Contacts.

7.5 The System contains "translation software" to permit the viewing (and marking) of documents created outside the system. The system can view documents created by different software programs and can deliver images of its translation to any computer meeting the criteria listed above.

7.6 The system can be personalized by the Construction Manager to automatically send e-mail notices upon issuance of certain documents if such a practice facilitates the User's business needs.

7.7 The system is the product of ***Building Blok LLC*** (www.buildingblok.com) and will be continuously updated.

7.8 The Construction Manager will administer the Building Blok User accounts for this project.

8. <u>DOCUMENTS CREATED INSIDE THE SYSTEM</u>

8.1 The following documents shall be created on templates inside the system.

a. Transmittals for submittals processed in the system. The transmittals are automatically created by the system when the submittal is uploaded.
b. Submittal Register showing all of the submittals required of the contract, assigned to each Contractor.
c. Submittal Log: The CM will maintain submittal log after it is initialized.
d. RFI (Requests for Information)
e. Change Orders
f. RFP (Requests for Proposal)
g. ASI (Architect's Supplemental Instructions)
h. Tasks & Memos as determined by the CM
i. Payment Applications
j. Closeout Tracking Log

8.2 The following documents may, at each Users option, be created on the system.

a. Morning & Afternoon Activity Reports generated by the system
b. E-mails: Contacts that do not have access to the system may be sent information from the system, by the system.
c. Reports of information on the system
d. Project Notices: "Broadcast" messages can be sent to other Users system entry screen.

9. DOCUMENTS CREATED OUTSIDE THE SYSTEM AND DISTRIBUTED BY THE SYSTEM

9.1 The following documents are expected to be created outside the system and distributed through the system. The actual documents may be scanned or electronically attached to the transmittal.

a. Technical Submittals: Shop drawings, product data, testing reports, certifications, installation instructions, operation & maintenance manuals, will be submitted and distributed through the system. The Architect will return all submissions through the system electronically. The Construction Manager will distribute submittals (after Architect's action) electronically. Contractors may download and distribute submittals to their subcontractors and suppliers or elect to print paper copies for distribution, or both.
b. Photographs: Digital photographs and scanned images can be loaded onto the system and shared.
d. Schedule of Values/ Payment Applications: (The "pencil" review of these documents can occur inside the system).
e. Change Orders: (The "pencil" review of these documents can occur inside the system.)
g. Schedules: The schedule document(s) will be available for review on the system.
h. Data created in other software may be uploaded to the system electronically.

10. DOCUMENTS CREATED OUTSIDE THE SYSTEM AND DISTRIBUTED OUTSIDE THE SYSTEM

10.1 The following documents are expected to be created outside the system and distributed outside the system. The actual documents may be scanned or electronically attached to the transmittal.

a. Schedules: The Construction Manager will develop the Master Schedule through Microsoft Project 2003. The schedule will be distributed either through hard copies at meetings or through email.
b. Product samples, color samples, physical samples are still required to be provided per the technical specifications, however, the transmittal documenting the distribution shall be done inside the system and submitted electronically and printed to accompany the actual submission.
c. Meeting minutes will be created using Microsoft Word 2003 and distributed through hard copies at meetings or through email.
d. AIA closeout documents, which require an "original" signature, will be created and distributed outside the system.

END OF SECTION

SECTION 013216 - CONSTRUCTION SCHEDULE

1. PRE-BID CONSTRUCTION SCHEDULE

1.1 Time is a critical element of this Project. By entering a bid, the Contractor agrees to adhere to the intermediate Milestone Dates and Dates of Substantial and Final Completion established herein. The Contractor also understands that all work must be performed in an orderly and closely coordinated sequence in order to achieve the specified Milestones and Completion Dates, and the Contractor hereby agrees to perform his work in conformance with the Pre-Bid Construction Schedule established herein, or with the then current and approved Project Construction Schedule as amended from time to time by the Construction Manager.

1.2 The Pre-Bid Construction Schedule includes allowances for time lost due to adverse and abnormal weather conditions, other than floods, hurricanes, tornadoes, lightening and other like acts of God. The Contractor understands and agrees that it shall not be entitled to any extensions of the Contract Time or adjustment to the Contract Sum, except as allowed in the General Conditions of the Contract for Construction. The Contractor further acknowledges that the Work may be required to be performed during the winter season, that conditions during this season may be adverse and abnormal, but that such conditions will not be the basis for an extension of the Contract Time or adjustment to the Contract Sum.

2. SCHEDULING OF THE WORK AFTER AWARD OF CONTRACT

2.1 After award of Contract, or issuance of a Notice to Proceed, the Contractor will meet with the Construction Manager to review the Pre-Bid Construction Schedule, and the overall project plan for construction. Following the above review the Contractor will meet with each subcontractor and supplier to view the detailed plans for performing his Work. Following these meetings and within fourteen (14) days after award of the Contract or issuance of a Notice to Proceed, the Contractor shall prepare and submit for the Construction Manager's approval a Work Schedule providing for the expeditious, timely and practical execution of the Work. The Contractor's Work Schedule shall include activity descriptions and durations for shop drawings, fabrication, delivery and installation. If the Construction Manager so requests, the Contractor shall provide adequate explanation regarding crew sizes, production rates and similar data used to arrive at the durations and sequences.

2.2 The Construction Manager shall review the Contractor's Work Schedule, coordinate it with the separate work by other contractors, the Owner and the Construction Manager, and after coordination, shall incorporate it into the approved Project Construction Schedule. The approved Project Construction Schedule shall be issued to the Contractor and the Contractor shall perform his Work in conformity therewith.

2.3 The Contractor shall submit proposed schedule revisions and obtain the written approval of the Construction Manager therefore before deviating from the Project Construction Schedule.

2.4 The Construction Manager will incorporate approved schedule revisions into the Project Construction Schedule, and shall otherwise update and revise the Project Construction Schedule as the Construction Manager, at his sole discretion, deems necessary.

3. ADHERENCE TO THE SCHEDULE

3.1 The Contractor shall start each part of its Work on the date designated for start in the approved Project Construction Schedule unless advised by the Construction Manager. The Contractor shall carry the Work forward expeditiously with adequate forces, equipment and materials, and shall complete each part of his work on or before the date designated in the approved Project Construction Schedule.

3.2 If the Construction Manager determines that the Contractor is behind schedule, the Construction Manager shall have the right to require that the Contractor take steps, at the Contractor's expense, to accelerate its Work. Such steps shall include increases in manpower, equipment and materials and/or overtime as the Construction Manager may deem necessary. If the Contractor fails to comply with the Construction Manager's instructions relating to improved rate of progress, the Contractor may be held in default under the appropriate provisions of the General Conditions of the Contract.

3.3 Each Contractor shall, if directed by the Construction Manager, provide the Construction Manager a 2-week look ahead of anticipated manpower showing the number of men, classification, and anticipated work.

END OF SECTION

SECTION 013219 - SUBMITTAL REGISTER

1. SUBMITTALS/SUBMITTAL REGISTER

1.1 The Contractor shall submit all items listed or specified within the sections of the Specifications included in its Work. Submittals shall include such items as: contractor's, manufacturer's or fabricator's drawings; descriptive literature including, but not limited to, catalog cuts, diagrams, operation charts or curves; test reports; samples, operations and maintenance manuals, including parts lists; certifications; warranties and other required submittals. Submittals pertinent to materials and equipment which are subject to advance approval shall be scheduled and made prior to the acquisition or the delivery thereof.

1.2 The Contractor shall carefully control procurement operations to assure that each individual submittal is made on or before the dates required for timely performance of its Work.

1.3 Within seven (7) days after award of Contract or issuance of Notice to Proceed, the Contractor shall execute and submit to the Construction Manager, seven (7) copies of the Submittal Register, on a form to be provided by the Construction Manager, on which shall be listed each item of equipment and material of each type for which fabricator's drawings and/or related descriptive data, test reports, samples, spare parts, operation and maintenance manuals, or other types of submittals required by the Specifications. The Submittal Register form shall be reproduced by the Contractor. The order of listing of items on the Register shall conform to the sequence of the items as they occur within the divisions. Drawings of component items forming a system or that are interrelated shall be scheduled to be correlated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time shall be allowed for review and approval and possible resubmittal of any item subject to approval, because no delay damages or time extensions will be allowed for time lost in late submittals or resubmittals. The Construction Manager and Architect/Engineer will review the Submittal Register for approval action. The approved Register will become a part of the Contract and Contractor will be subject to requirements thereof. The Contractor shall revise and/or update the Register monthly to take into account all changes in the Contract. Each such revised edition and/or revision to the Register shall be resubmitted to the Construction Manager. This Register shall be coordinated with related submittals of other Contractors.

2. SAMPLES

2.1 Submit tagged or labeled samples in triplicate, unless another quantity is otherwise specified by the Construction Manager.

2.2 Tags or labels shall be securely affixed and contain as a minimum the following information: Project Name, Contractor's Name, Contract Title and Number, Date, Transmittal Number, Product Manufacturer's or Fabricator's Name and Product Identifier.

END OF SECTION

SECTION 013226 - SUBCONTRACTOR DAILY REPORTS

1. SUBCONTRACTOR DAILY REPORTS

1.1 The Subcontractor shall submit a Daily Report to the Construction Manager on the forms provided covering the following subjects:

1. Work in Progress, including areas where work is being performed, nature of the operations in progress, and the manpower assigned.

2. Extra Work (Time and Material) in progress.

3. Materials Received.

4. Trade labor breakdown including identification of all workers on site and the number of hours (or portions thereof) worked by each.

5. Inspection Checklist (performed daily).

1.2 The Subcontractor shall submit the Daily Report to the Construction Manager by 9:00 AM on the next workday following the workday covered in the Daily Report.

2. DAILY EXTRA WORK REPORT

2.1 The Subcontractor shall submit on the form provided a Daily Extra Work Report on each day he performs authorized Extra Work on a time and material basis.

2.2 A separate Daily Extra Work Report shall be submitted for each separate authorized Extra Work item done on a time and material basis.

2.3 The Subcontractor shall submit his Daily Extra Work Report as an attachment to his Daily Report by 9:00 AM on the next workday following the workday covered in the Daily Extra Work Report.

3. Sample Daily Report

3.1 A sample daily report follows this section for your reference.

END OF SECTION

EDiS COMPANY

CONTRACTOR'S DAILY REPORT

Project Name: _____

Date: _____

Contractor: _____

Contract No. & Description: _____

Weather: _____

Foreman's Name (Print) _____

TRADE	*CLASS	MANPOWER COUNT	TOTAL MAN HOURS	TODAY'S DESCRIPTION / LOCATION OF WORK
	TOTAL			

** INDICATE: F = FOREMAN; J = JOURNEYMAN; A = APPRENTICE*

Work Status/Work Planned:

Construction Equipment:

Qualified Operator(s)

Deliveries or Materials:

Machinery, tools, material, and equipment to be used:

Inspection of work area, machinery, tools, material, or equipment

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable requirement Is prohibited. Such machine, tool, material or equipment shall either be identified as unsafe by tagging or locking The controls to render them inoperable or shall be physically removed from its place of operation.

Please See Other Side

Below is a general checklist of requirements on this project. Contractors will check off items that pertain to their contract and project tasks. Notify EDiS Field Manager of any issues. This checklist is not meant to be all inclusive. Please refer to additional OSHA regulations for compliance.

House Keeping

- ☐ Material Storage Area's Orderly
- ☐ Trash Containers Available and Emptied daily
- ☐ Fire Hazards
- ☐ Lighting and ventilation
- ☐ Exits and Stair clear passage
- ☐ Walkways, corridors clear passage
- ☐ Daily debris /trash removal
- ☐ _____

Personal Protective Equipment

- ☐ Hard Hats being worn
- ☐ Safety Glasses with side shields being worn
- ☐ Secondary Eye/Face protection
- ☐ Respirators as required
- ☐ Hand protection when needed
- ☐ Ear protection when needed
- ☐ Inspected & Maintained
- ☐ _____

Fire Prevention

- ☐ Fire extinguishers inspected
- ☐ Flammable / Combustibles properly store
- ☐ Approved Fuel cans used and labeled
- ☐ Oxygen / Acetylenes stored properly
- ☐ _____

Electrical

- ☐ GFI in use
- ☐ Three prong insulated extension cords used
- ☐ Extension cords in good condition
- ☐ Lockout / Tag-out program in use
- ☐ _____

Excavations

- ☐ Miss Utility been contacted
- ☐ Properly Barricaded
- ☐ Ladders in use at depths over 4'-0"
- ☐ Ladders every 25'-0" distance
- ☐ Shored, sloped, benched as required
- ☐ Dewatering as needed
- ☐ _____

Ladders

- ☐ Good condition
- ☐ Correct pitch
- ☐ Extends 3'-0" above landing
- ☐ Open and secured / tied off
- ☐ _____

Scaffolds

- ☐ Certified Scaffold Installer
- ☐ Guardrails, toe boards, and planking secured
- ☐ Appropriate signage
- ☐ Adequate cross bracing
- ☐ Secured to building over 25'-0" in height
- ☐ _____

Cranes

- ☐ Rated Load Capacity available in cab
- ☐ Swing Radius barricaded
- ☐ Appropriate certificates / decals / hand signals
- ☐ Daily safety inspection log completed
- ☐ _____

Fall Protection

- ☐ Fall protection plan on file
- ☐ Full harness / shock absorbing lanyard used
- ☐ Anchoring points secured
- ☐ Perimeter barricades
- ☐ Open sided floor protection
- ☐ 6'-0" Tie-off utilized
- ☐ _____

Paperwork

- ☐ MSDS Information
- ☐ Contractors Safety Program
- ☐ Hazardous Communications Training
- ☐ Hazardous Communications Program
- ☐ Contractor Qualified Representation
- ☐ _____

Other

- ☐ _____
- ☐ _____

Foreman / Competent Person:

Print Name_____

SECTION 013300 – SUBMITTAL PROCEDURES

1. GENERAL PROVISIONS

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

2. ITEMS TO BE SUBMITTED AT START OF WORK

2.1 Performance/Labor and Material Payment Bond(s): One (1) copy of each bond simultaneously with the signed Agreement. See General Conditions Article 11.4 and Supplementary Conditions.

2.2 Policies or Certificates of Insurance: Two (2) copies simultaneously with the signed Agreement. See General Conditions Article 11 and Supplementary Conditions.

2.3 Contractor's License: Submit a copy of all business licenses required by local and state agencies.

2.4 Contractor's Schedule of Values: Two (2) copies for approval within 21 days after the Agreement is signed. See General Conditions Article 9.2 and provisions in this Section.

2.5 Contractor's Progress Schedule: Two (2) copies for review and reference within 21 days after the Agreement is signed. See General Conditions Article 3.10 and provisions in this Section.

2.6 Submittal Schedule: Two (2) copies for review and reference within 21 days after the Agreement is signed. See provisions in this Section.

2.7 Products List: Two (2) copies for approval within 30 days after the Agreement is signed. See provisions in Section 016200 - MATERIAL AND EQUIPMENT.

3. NON-RESIDENT CONTRACTOR & SUBCONTRACTORS BONDS

3.1 Refer to requirements in Section 011100 - INSTRUCTIONS TO BIDDERS for filing of Surety Bonds with the Division of Revenue.

3.2 If such bonds are required on this project, it will be the responsibility of the Contractor to produce evidence to the Construction Manager that they have been filed, or if not required, to supply a notarized statement that they are not required. This must be done within seven (7) days after award of Contract and in any event before construction starts.

4. RELATED REQUIREMENTS

4.1 See Section 017700 - CONTRACT CLOSE OUT: for submittal requirements for Contract Close out.

5. SUBMITTALS

5.1 All submittals shall be directed to the Construction Manager in the manner directed by the Construction Manager, and paragraph 9 of this section. Contractor shall use the Contractor Submittal Form appended to this section.

5.2 Prepare a Submittal's Schedule for Shop Drawings, Product Data and Samples. Show:

1. The dates for Contractor's submittals.

2. The dates submittals will be required for Owner-furnished products.

3. The date approved submittals will be required from the Architect.

5.3 Should the Architect or Construction Manager elect to omit any items from the list of items to be reviewed, it shall not relieve the Contractor from compliance with the Contract Documents with regard to that item. In such instance, the Contractor may still elect to have submittals prepared for his own use without review by the Architect or Construction Manager.

6. SHOP DRAWINGS

6.1 Conform to provisions in General Conditions applying to Shop Drawings.

6.2 Present in a clear and thorough manner.

1. Identify details by reference to sheet and details, schedule or room numbers shown on Contract Drawings.

2. Maximum sheet size: 30" x 42".

7. PRODUCT DATA

7.1 Conform to provisions in General Conditions applying to Product Data.

7.2 Preparation:

1. Clearly mark each copy to specifically identify products or models pertinent

to project.

2. Show performance characteristics and capacities.

3. Show dimensions and clearances required.

4. Show wiring or piping diagrams and controls.

7.3 Manufacturer's standard schematic drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the Work.

2. Supplement standard information to provide information specifically applicable to the Work.

8. SAMPLES

8.1 Conform to provisions in General Conditions applying to Samples.

8.2 Provide samples of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the project, with integrally related parts and attachment devices.

2. Full range of color, texture and pattern.

8.3 Field samples and mock-ups; See requirements, if any, in other specification Sections.

9. SUBMITTAL REQUIREMENTS

9.1 Make submittals promptly through the Construction Manager in accordance with published schedule, and in such sequence as to cause no delay in the Work or in the Work of any other contractor.

9.2 Number of submittals required.

1. Shop drawings: Submit eight (8) copies for each submittal. Copies will be marked up with corrections and comments, stamped and returned. Any additional copies required by the Contractor shall be made by him.

2. Product Data: Submit eight (8) copies. Four (4) will be retained by the Architect, the Construction Manager and the Consultants. Four (4) will be reviewed, marked and stamped by the Architect and returned to the Contractor by the

Construction Manager. Any additional copies required by the Contractor shall be made by him from the stamped copy.

3. Samples: Submit four (4) each. Submit all transmittal data and pictures of samples through the Building Blok Management System for tracking purposes. When approved the samples will be returned to the Construction Manager to be retained at the site for reference use.

9.3 Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The Project title and number.
3. Contract identification.
4. The names of the Contractor, Supplier and Manufacturer.
5. Identification of the product, with the specification section number.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards, such as ASTM or Federal Specification numbers.
9. Identification of deviations from Contract Documents.
10. Identification of revisions on resubmittals.
11. An 8 inch x 3 inch blank space for Contractor and Architect's stamps.
12. Contractor's stamp, initialed or signed, certifying review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents. Submittals which have not been stamped with this stamp or its approved equivalent will be returned without being reviewed.

9.4 Shop Drawing coordination and interface with work of other Contracts and adjacent work is the responsibility of each individual Contractor.

10. RESUBMISSION REQUIREMENTS

10.1 Make any corrections or changes in the submittals required by the Architect and resubmit until approved.

10.2 Shop drawings and Product Data:

1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

2. Indicate any changes which have been made other than those requested by the Architect.

10.3 Samples: Submit new samples as required for initial submittal.

11. FINAL DISTRIBUTION OF APPROVED SUBMITTALS

11.1 The Construction Manager will receive and log submittals and forward to Architect after processing.

11.2 The Construction Manager will distribute copies of Shop Drawings and Product Data which carry the Architect's stamp to:

1. Contractor that made submittal.

2. Jobsite File.

3. Record Document File.

4. Other Contractors, as required for coordination.

11.3 The Construction Manager will distribute samples as required.

11.4 The Contractor will distribute copies of Shop Drawings and Product Data which carry the Architect's stamp to:

1. Subcontractors.

2. Suppliers.

3. Fabricators.

12. SCHEDULE OF VALUES

12.1 Use AIA Document G703, Continuation Sheet to G702.

13. PROGRESS SCHEDULE

13.1 Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar chart for each trade or operation.

2. Horizontal time scale: Identify the first work day of each week.

3. Scale and spacing: To allow space for notations and future revisions.

4. Minimum sheet size 11 inches by 17 inches.

13.2 Format of listings: The chronological order of the start of each item of work.

13.3 Show the complete sequence of construction by activity.

13.4 Show the dates for the beginning, and completion of, each major element of construction such as:

1. Site clearing.

2. Site utilities.

3. Foundation work.

4. Structural framing.

5. Subcontractor work.

6. Equipment installation.

13.5 Show projected percentage of completion for each item as of the first day of each month.

13.6 Update Progress Schedule monthly and submit with Application for Payment and Schedule of values.

13.7 Indicate progress of each activity to date of submission.

13.8 Show changes occurring since previous submission of schedule:

1. Major changes in scope.

2. Activities modified since previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

13.9 Provide a narrative report as needed to define:

1. Problem areas, anticipated delays and the impact of the schedule.

2. Corrective action recommended, and its effect.

3. The effect of changes on schedules of other prime contractors.

13.10 Submit one reproducible transparency.

13.11 After review, distribute copies of the schedule to:

1. Jobsite File.

2. Subcontractors.

3. Architect.

4. Owner.

13.12 Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

END OF SECTION

SECTION 013500 – CONTRACTOR EMPLOYEE BACKGROUND CHECK

1. It is the contractor's responsibility to perform background checks and screen all employees working onsite. The background check must include checking for a previous history of Child Abuse Convictions, Child Molestation Convictions, Felony Convictions, and Drug Convictions within the last 5 years. Any employee with any of these convictions may not enter the job site or school campus. This background check must be completed and screened by the contractor prior to an employee entering the job site. The Construction Manager, The Owner's representative and the Owner have the right to request that the screening data be submitted on a case by case basis.

END OF SECTION

SECTION 013523 - SAFETY PROGRAM

1. GENERAL

1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety activities and programs in connection with the Work.

1.2 Contractor shall be responsible for the safety of its personnel.

1.3 Hard hats and safety glasses must be worn by all personnel on the jobsite, except in contractor's administrative office/trailer. All equipment must comply with OSHA standards. All job site personnel shall wear long pants, shirts (no tank tops) and work boots.

2. SAFETY PROGRAM

2.1 Prior to commencing the Work, the Contractor shall submit to the Construction Manager (1) electronic copy and (1) bound copy of its safety program and one (1) copy of MSDS information in a 2" ringed notebook. One paper copy of the safety program and MSDS will be retained by the Construction Manager in the field office.

2.2 The safety program shall outline those hazards peculiar to the Contractor's Work, and the steps to be taken to eliminate or reduce the risk of injury or loss due to those hazards**. The program shall be site specific.** Contractor shall implement and enforce its safety program, which is in accordance with all OSHA, Federal, State and local laws.

2.3 Contractor shall designate a qualified Safety Supervisor to implement their safety program. Unless otherwise approved by the Construction Manager, the Safety Supervisor shall be the Contractor's Field Superintendent/Foremen.

2.4 Contractor shall furnish the names and qualifications of the competent persons and qualified persons who may be required for their scope of work by the Contractor's safety procedures, and by federal, state and/or local regulations. Examples include competent persons and/or qualified persons for steel erection, excavation, scaffold erection, confined space entry, crane and rigging operations, annual crane inspections, fall protection including horizontal lifeline systems, etc. See the attached Competent/Qualified Person Designation Log.

2.5 Contractor shall provide written certification showing that all employees have been trained on the Contractor's Safety Program. The written certification record shall contain the name or other identity of the employee trained, the date(s) of the training and the signature of the person who conducted the training or the signature of the

employer. If the employer relies on training conducted by another employer or completed prior to the effective date of this section, the certification record shall include the date the employer determined the prior training was adequate rather than the date of actual training. The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury. Please forward certification (document) of training for each employee on an EDiS project. The latest training certificate shall be maintained.

2.6 Contractor shall provide certification of training on the following programs, as they pertain to your contract and project tasks: Scaffold, Fall Protection, Crane Operator, Signal Person, Crane Maintenance, Steel Erection Fall Protection, Respiratory Protection, Powder-Actuated Tools, and Motor Vehicles. Certification of training must include: Employee's name, date of training, person conducting the training, topics covered, and a statement that the student has successfully completed the course. This list is not meant to be all inclusive; please refer to OSHA regulations for applicable safety requirements.

2.7 Contractor Daily Reports with Safety Inspection Checklist will be submitted daily to Field Manager, verifying inspection of work area, machinery, equipment and tools.

2.8 Prior to starting work on-site, the Contractor shall arrange with the on-site Field Manager to have their employees complete the EDiS Company Zero Accidents Safety Orientation program.

2.9 Contractor shall hold weekly safety toolbox talks with all of its employees every Monday at 12:30 PM. The Contractor shall designate a responsible, capable person to conduct these meetings. Contractor's safety supervisor or superintendent must submit to the Construction Manager weekly toolbox talks attendance sheets and the topics discussed.

3. SUBSTANCE ABUSE POLICY STATEMENT

The Construction Manager is committed to providing a safe work site environment for its employees and Contractors' employees. The Construction Manager does not condone or permit employees and Contractors' employees to use or be under the influence of drugs or alcohol while they are on any of the Construction Manager's work sites. The Policy is as follows:

3.1 It is a violation of the Construction Manager's policy for employees and Contractors' employees to use, possess, sell, trade, or otherwise engage in the use of illegal drugs and alcohol.

3.2 It is a violation for employees and Contractors' employees to report to work while influenced by illegal drugs or alcohol.

3.3. It is a violation for employees and Contractors' employees to use prescription drugs illegally (i.e. to use prescription drugs that have not been legally obtained) and to use prescription drugs in a manner other than the prescribed intentions.

3.4 Employees and Contractors' employees who are taking medication, which is prescribed by their physician, are expected to discuss potential side effects with their prescribing physician, as it relates to the work requirements.

Violations of this policy will require disciplinary action. If any employees or Contractors' employees are observed or suspected of being influenced by drugs or alcohol, they will be instructed to stop work and may be required to leave the work site.

4. EXECUTION

4.1 Contractor shall comply with all applicable federal, state and local laws, regulations and orders relating to occupational safety and health, and related procedures, and shall, to the extent permitted by law, indemnify and hold Construction Manager, Owner and Architect, and their respective directors, officers, or agents and employees, harmless from any and all liability, public or private, penalties, contractual or otherwise, losses, damages, costs, attorney's fees, expenses, causes of action, claims or judgments resulting from a claim filed by anyone in connection with the aforementioned acts, or any rule, regulation or order promulgated thereunder, arising out of the Contractor's Work, this Agreement or any subcontract executed in prosecution of the Work. Contractor further agrees in the event of a claim of violation of any such laws, regulations, orders or procedures arising out of or in any way connected with the performance of this agreement, Construction Manager may immediately take whatever action is deemed necessary by Owner and/or Construction Manager to remedy the claim or violation. Any and all costs or expenses paid or incurred by Owner and/or Construction Manager in taking such action shall be borne by Contractor, and may be deducted from any payments due Contractor.

4.2 The Contractor agrees to (1) take all necessary steps to promote safety and health on the job site; (2) cooperate with Owner and/or Construction Manager and other Contractors in preventing and eliminating safety and health hazards: (3) train, instruct and provide adequate supervision to ensure that its employees are aware of, and comply with, applicable Federal and State safety and health laws, standards, regulations and rules, safe healthful work practices and all applicable safety rules, regulations and work practices and procedures (4) not create any hazards or expose any of its employees, employees of the Owner and/or Construction Manager or employees of Contractors to any hazards; and (5) where the Contractor is aware of

the existence of a hazard not within its control, notify the Construction Manager of the hazard as well as warn exposed persons to avoid the hazard.

4.3 The Contractor's Superintendent or Safety Supervisor shall immediately, verbally report, and promptly thereafter confirm in writing to the Construction Manager any unsafe conditions or practices that are observed, or violations of job safety which are not within the Contractor's control.

4.4 Contractors shall immediately, verbally report, and promptly thereafter confirm in writing, to the Construction Manager any unsafe practices or conditions that are observed which are not under the Contractor's control.

4.5 The Contractor's Superintendent or Safety Supervisor shall insure that adequate first aid supplies are available, and that personnel are qualified to administer first aid/CPR, as required by State and/or Federal regulations.

4.6 Contractor shall promptly notify Construction Manager of any personal injury requiring medical treatment of any of the Contractor's employees at the Project site; or of significant damage to property arising in connection with Contractor's performance, as promptly as possible after the occurrence of such injury or damage. Within twenty-four hours of such occurrence, Contractor shall furnish to Construction Manager a complete written report of such injury or damage.

4.7 Contractor certifies that the forgoing terms shall be made applicable to all Contractors' suppliers, materialmen or anyone furnishing labor and/or materials to the site.

4.8 The Contractor shall continue to educate his job Safety Supervisor or Superintendent of their responsibilities, which shall include:

1. Instructing workers and subcontractors under its supervision in safe work practices and work methods at the time they are given work assignments.

2. Ensuring that its workers and subcontractors have and use the proper protective equipment and suitable tools for the job.

3. Continuously checking to see that no unsafe practices or conditions are allowed to exist on any part of his job.

4. Acquainting its workers and subcontractors with all applicable safety requirements and seeing that they are enforced.

5. Setting a good example for his workers.

6. Making a complete investigation of accidents to determine facts necessary to take corrective action.

7. Promptly completing a "Supervisor's Investigation Form" with his Supervisor's assistance and distributing as required. This form will be provided by the Construction Manager.

8. Holding weekly "tool box" safety meetings with his men to:
   a. Discuss observed unsafe work practices or conditions including a review of current Construction Manager safety report.

   b. Review the accident experience of his crew and discuss correction of accident causes.

   c. Encourage safety suggestions from his men.

9. Seeing that prompt medical treatment is administered to an injured employee.

10. Correcting or reporting immediately to job superintendent any observed unsafe conditions, practices or violations of job security.

11. Making all reports required by these Contract Documents to the Construction Manager in a full and timely fashion.

5. SAFETY MEETINGS

5.1 The Contractor's Project Manager or Superintendent shall attend weekly or biweekly supervisory job meetings. The first topic of these meetings will be job site safety. The weekly safety reports will be reviewed and violations must be corrected immediately. Contractors will be encouraged to participate in the on-going jobsite safety.

6. TOOL BOX SAFETY MEETINGS

6.1 The Contractor shall schedule weekly "tool box" safety sessions to be held by his job safety supervisor or superintendent for all of his employees.

6.2 A member of the Contractor's management staff shall periodically attend "tool box" safety sessions to evaluate their effectiveness and offer any appropriate suggestions for improvement.

7. REPORTS

7.1 Contractors shall report all accidents or injuries on a timely basis in accordance with all applicable regulations.

7.2 Contractors shall promptly complete an accident investigation report of all accidents.

7.3 A record of all "tool box" safety sessions shall be made and submitted to the Construction Manager on forms to be provided.

8. SAFETY REPRESENTATIVE

8.1 The Construction Manager may employ the services of a Safety Representativ*e* on the project.

8.2 The Safety Representative *will* visit the job site on a weekly basis to determine if the work is being performed in a safe manner and in accordance with OSHA, State and Local safety regulations. Safety representative is not responsible for observing and documenting all possible safety violations. The Contractor's Safety Representative or Superintendent shall attend job site safety inspections with the Safety Representative on a weekly basis.

8.3 The Safety Representative will file a written report with the Construction Manager at the end of each inspection listing the safety violations observed during the inspection.

8.4 The Construction Manager will distribute the Safety Representative's report to all Contractors. All safety violations must be corrected immediately.

9. RIGHT TO STOP THE WORK DUE TO SAFETY VIOLATIONS

9.1 The Construction Manager, in its sole discretion, may order the Contractor to stop the work due to safety violations under the following circumstances:

1. If the Construction Manager observes the Contractor is violating safety regulations and the Contractor takes no immediate action to correct the violation.

2. If the Contractor has been notified by the Construction Manager in writing that he is in violation of safety regulations and fails to take action to correct the violation within 24 hours of the notice.

9.2 If the Construction Manager directs the Contractor to stop the work due to safety violation, it will be done in accordance with the General Conditions of the Contract. Contractor shall not be permitted an adjustment of the Contract Time or Sum for the days lost to any suspension of work.

9.3 If the Construction Manager or Safety Representative observes Contractor's employee violating this safety program or OSHA Standards in an habitual manner, or creating a serious life safety violation, the Construction Manager or Safety Representative may instruct the Contractor's superintendent or foreman to remove the violator from the work site for failure to comply with the safety program and the contract.

10. EMERGENCY PROCEDURES

10.1 The Construction Manager shall establish a central meeting location for the assembly of all Contractors' employees in the event of a major job site emergency.

10.2 Contractor shall assemble all of their personnel and account for all employees. Contractor must immediately report to the Project Superintendent with the status of their employees.

11. FALL PROTECTION PROCEDURES

11.1 Contractor is responsible, in accordance with federal, state, local laws and regulations including OSHA, to provide and enforce their own site specific fall protection program and equipment. The following fall protection procedures shall be enforced by all Contractors as a minimum standard.

All workers on walking/working surfaces with unprotected sides or edges six feet (6') or higher above the next lower level must be protected from falls by the use of guardrail systems, net systems, fall arrest systems or control access zone programs. It is intended that when fall protection is required, it is required 100% of the time. All contractors are reminded that relevant industry regulations require that contractors comply with the following standards.

1. Workers constructing or working near leading edges must be protected.

2. Workers on the face of formwork or reinforcing steel must be protected at a height of 6 feet (6') or greater.

3. Scaffolds shall be guarded at 6 feet (6') above next lower level.

4. Brick layers performing overhand bricklaying and related work six feet (6') or higher above lower levels must be protected from falls.

5. Roofers must comply with OSHA standards for roof work.

6. The Contractor's controlled access zone plan shall be included in their site-

specific safety program and shall be submitted prior to the start of work. Contractors are responsible for assuring programs are OSHA compliant.

7. Guidelines for Residential Construction or any interpretations will not be accepted in lieu of 1926 Standards.

8. Contractors must provide certification per OSHA CFR29 § 1926.503(b) of employee training and retraining on fall protection upon request.

11.2 Contractor shall provide its own fall protection. Fall protection may be provided by guardrail systems, net systems, or personal fall arrest systems. All fall protection systems must comply with OSHA standards.

11.3 Stepladders, exposed to shafts or edges of the building, greater than six feet (6') above the next lower level, must be tied off or otherwise secured. Employee must wear fall protection, i.e. harness/lanyard.

11.4 The Safety Cable System shall not be altered or removed without a written request submitted to the Project Manager with a copy to the Field Manager. It shall be the responsibility of each and every Contractor that is removing or altering the Safety Cable System to maintain the fall protection safety provided by the safety cable and not leave the area unprotected. Each and every Contractor shall be responsible to re-install the Safety Cable System immediately after work is completed. Each and every Contractor shall be responsible to re-install the Safety Cable System in accordance to OSHA standards.

11.5 Fall protection will be enforced for Structural Steel Erectors.

1. As for a Contractor engaged in structural steel erection, the Contractor is specifically advised that structural steel erectors shall comply with all protection requirements for all work at a height of six feet (6') or greater above the next lower level, 100 percent of the time, by any of the following means.

   a. Standard guardrail system.

   b. Personal Fall Arrest System (PFAS) – full body harness with shock absorbing lanyard. Maximum free fall distance permitted, with lanyard and lanyard attachment shall not exceed six feet (6'). Anchor point must be capable of supporting five thousand pounds. Perimeter guard cables or alignment cables may not be used for anchor points.

   c. Access to work area shall be provided by ladders. There shall be sufficient number of ladders available to reduce the amount of "beam walking." When it is absolutely necessary to traverse a beam, 100% fall protection must be

utilized.

d. Steel erection Contractors must, at all times, be able to certify in writing that each of his employees has been properly trained in both OSHA fall protection standards and the Contractor's site specific project fall protection procedures.

e. Prior to the erection of the steel, the Contractor shall meet with the Project Manager and Safety Representatives to review and document site specific procedures.

END OF SECTION

Red Clay Consolidated School District
Wilmington Campus Renovations
Bid Pack 'A'
April 15, 2013

CONTRACTOR

COMPETENT / QUALIFIED PERSON DESIGNATION LOG

Project: Wilmington Campus Renovations **Field Manager:**

Contract: Contrctor:	Applicable to Subcontractor (yes / no)		Foreman	Competent Person (if not foreman)
Subpart C-General Provisions				
1926-20 General Safety				
Subpart D - Health and Environmental Controls				
1926-53 Ionizing Radiation				
1926-55 Gases, Vapors, Fumes, Dusts, Mists				
1926-57 Ventilation				
1926.59 Hazard Communication				
1926.62 Lead				
Subpart E - Personal Protective Equipment				
1926.101 Hearing				
1926.103 Respirator Protection				
Subpart H - Materials Handling, Storage				
1926.251 Rigging Equipment for Material Handling				
Subpart J - Welding and Cutting				
1926.354 Welding, Cutting and Heating				
Subpart K - Electrical				
1926.404 Wiring Design and Protection				
Subpart L - Scaffolding				
1926.451 Scaffolding				
Subpart M - Fall Protection				
1926.502 Fall Protection Criteria and Practices				
1926.503 Training				
Subpart N - Cranes, Derrick -Redesignated 1926.1501				
Subpart O - Motor Vehicles and Equipment				
1926.601 Motor Vehicles				
Subpart P - Excavations				
1926.651 Specific Excavation Requirements				
1926.652 Requirements to Protective Systems				
Subpart S - Tunnels, Shafts, Caissons				
1926.800 Tunnels, Shafts, Caissons				
1926.803 Compressed Air				
Subpart T - Demolition				
1926.850 Preparatory Operations				

Contract: Contrctor:	Applicable to Subcontractor (yes / no)		Foreman	Competent Person (if not foreman)
1926.852 Chutes				
1926.859 Mechanical Demolition				
Subpart V - Power Transmission and Distribution				
1926.955 Overhead Lines				
Subpart X - Stairways and Ladders				
1926.1053 Ladders				
1926.1060 Training Requirements				
Subpart Z - Toxic and Hazardous Substances				
1926.1101 Asbestos				
1926.1101 thru 1926.1148 Toxic and Hazardous Substances				

I certify that the listed employees are competent persons, as defined and required by specific OSHA standards. They are capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Name (print)

Contractor Signature

Date

PU09, Revised 3/2012

Certification of Training Documents to be Submitted with Safety Policy/Program

Provide a certification of training for employees on your safety program.

In addition, Contractor shall provide certification of training on the following programs, as they pertain to your contract and project tasks. Certification of training must include: Employee's name, date of training, person conducting the training, topics covered, and a statement that the student has successfully completed the course. This list is not meant to be all inclusive: please refer to OSHA regulations for applicable safety requirements.

a. ☐ Scaffold: 1926.454

b. ☐ Fall Protection 1926.503

c. ☐ Crane Operator: 1926.1427

d. ☐ Signal person (this is for any persons connecting material or equipment for lifting): 1926.1428

e. ☐ Crane maintenance: 1926.1429

f. ☐ Steel erection fall protection: 1926.761

g. ☐ Respiratory protection (medical clearance and training records complying with 1910.134

h. ☐ Powder-actuated tools: 1926.302

i. ☐ Motor Vehicles (are those vehicles that operate within an off-highway jobsite, not open to public traffic): 1926.21

SECTION 014500 - QUALITY CONTROL

1. DESCRIPTION

1.1 Quality control services include inspections and tests performed by independent agencies and governing authorities, as well as by the Contractor. Inspection and testing services are intended to determine compliance of the work with requirements specified. Specific quality control requirements are specified in individual specification sections.

2. RESPONSIBILITIES

2.1 Contractor Responsibilities: Except where indicated as being the Owner's responsibility, quality control services are the Contractor's responsibility, including those specified to be performed by an independent agency and not by the Contractor. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

1. The Owner will engage and pay for services of an independent agency to perform the inspections and tests that are specified as Owner's responsibilities.

2.2 Retest Responsibility: Where results of inspections or test do not indicate compliance with Contract Documents, retests are the Contractor's responsibility.

2.3 Responsibility for Associated Services: The Contractor shall cooperate with independent agencies performing inspections or test. Provide auxiliary services as are reasonable. Auxiliary services include:

1. Provide access to the Work.

2. Assist taking samples.

3. Deliver samples to test laboratory.

2.4 Coordination: The Contractor and independent test agency shall coordinate the sequence of their activities and shall avoid removing and replacing work to accommodate inspections and test. The Contractor is responsible for scheduling time for inspections and tests.

2.5 Qualifications for Service Agencies: Contractor shall engage only inspection and test service agencies which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories.

2.6 Submittals: Contractor shall submit a certified written report of each test, Inspection or similar service, in duplicate to the Construction Manager. Contractor shall submit additional copies of each report to any governing authority, when the authority so directs.

2.7 Report Data: Written inspection or test reports shall include:

1. Name of testing agency or test laboratory.
2. Dates and locations of samples, tests or inspections.
3. Names of individual present.
4. Complete inspection of test data.
5. Test results.
6. Interpretations.
7. Recommendations.

2.8 Repair and Protection: Upon completion of inspection or testing, Contractor shall repair damaged work and restore substrates and finishes. Contractor shall comply with requirements for "Cutting and Patching."

END OF SECTION

SECTION 015113 - TEMPORARY ELECTRICITY

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

1. Electrical Basic Materials and Methods, Division 16 or 26.

1.2 DESCRIPTION OF SYSTEM

1. Power Source

1. Suppliers: Delmarva Power

2. The Construction Manager shall provide 277/480 volt, three phase, 60 cycle power service to the site from the existing service.

3. The Construction Manager will make all arrangements for bringing the power supply to the site and for installation of appropriate temporary transformers to provide for the power supply in 1.2.1.2, above.

4. The source will be adequate to service temporary electrical needs of the proposed construction.

2. Electrical Service

1. Contractor will be responsible to pay for all costs associated with providing electrical service from the power source to their respective site office, temporary storage facilities or temporary construction buildings as appropriate.

2. Prior to issuance of the Notice to Proceed for the electrical contract, the Construction Manager will be responsible for providing temporary electrical service as provided in 1.2.2.3, below. After issuance of the Notice to Proceed for the electrical contract, the Electrical Contractor shall become responsible for maintaining all electrical power supply and service facilities installed by the Construction Manager. The Electrical Contractor shall also, from that date forward, be responsible for providing and maintaining temporary electrical service to the site as provided in 1.2.2.3, below.

3. The Construction Manager or Electrical Contractor, as provided in 1.2.2.2 above, shall install temporary electric service for items below, throughout the construction period, such that power can be secured at any desired point with no more than a 60 foot extension:

1. Power Centers for miscellaneous tools and equipment used in the construction work shall be provided with a minimum of four 20-amp, 120 volt grounding type outlets. Each outlet shall be provided with ground fault detecting circuit breaker protection.

2. Adequate lighting for safe working conditions shall be provided and maintained on a 24 hour per day basis throughout the building, tunnels, and stairways per OSHA requirements. Each lamp must be rated at least 100 watts. Voltage of each socket must be at least 110 volts.

3. Power for testing and checking equipment must be supplied.

3. Capacity

1. All electrical power supply and service lines installed shall be of adequate capacity for construction use by all trades during the construction period at the locations necessary.

2. The Electrical Contractor shall notify the Power Company if unusually heavy loads, such as welding units, are anticipated.

4. Power Costs

1. The Construction Manager will pay all costs of temporary electrical power used during construction.

2. The Owner will pay all costs of power used in the permanent wiring.

1.3 REQUIREMENTS AND REGULATORY AGENCIES

1. The Electrical Contractor will obtain permits as required by local governmental authorities.

2. The temporary electrical service shall comply with National Electrical Code, 1990 Edition and applicable local codes and utility regulations.

1.4 USE OF PERMANENT SYSTEM

1. The Electrical Contractor shall regulate any part of the permanent electrical system which is used for construction purposes to prevent interference with safety and orderly progress of the Work.

2. Contractors shall leave permanent electrical services in a condition as good as

new and clean.

2. PRODUCTS

2.1 MATERIALS

1. General

1. The materials may be new or used, but must be adequate in capacity for the purposes intended and must not create unsafe conditions or violate the requirements of applicable codes.

2. Conductors

1. Use wire, cable, or busses of appropriate type, sized in accordance with the National Electrical Code for the applied loads.

2. Use only UL labeled wire and devices.

2.2 EQUIPMENT

1. Provide appropriate enclosure for the environment in which used in compliance with NEMA standards.

3. EXECUTION

3.1 GENERAL

1. Install all work with a neat and orderly appearance.

2. Make structurally sound throughout.

3. Maintain to give continuous service and to provide safe working conditions.

4. Modify temporary power and light installation as job progress requires.

3.2 INSTALLATION

1. Locate so that interference with storage areas, traffic areas and work under other Contracts is avoided.

3.3 REMOVAL

1. Remove all temporary equipment and materials completely upon completion of

construction.

2. Repair all damage caused by the installation and restore to satisfactory condition.

END OF SECTION

SECTION 015123 - TEMPORARY HEATING, COOLING AND VENTILATING

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

1. Temporary Electric: Section 015113

2. Temporary Facilities: Section 015200

3. Heating Requirements for Cold Weather Installation and Protection of Materials: Respective specification section for each item of work.

1.2 DEFINITIONS

1. Temporary Enclosures: Sufficient preliminary enclosures of an area of structure, or of an entire building, to prevent entrance or infiltration of rain water, wind or other elements and which will prevent undue heat loss from within enclosed area.

2. Permanent Enclosure: Stage of construction at which all moisture and weather protection elements of construction have been installed in accordance with Contract Documents, either for a portion of structure, or for an entire building.

1.3 DESCRIPTION OF SYSTEM

1. Prior to the building or portion of building being permanently enclosed, the contractor shall provide temporary heat and ventilation and weather protection necessary for his work, as described below. After permanent enclosure, the Construction Manager will provide temporary heat and ventilation in enclosed areas required to:

1. Facilitate progress of Work.

2. Protect Work and products against dampness and cold.

3. Prevent moisture condensation on surfaces.

4. Provide suitable ambient temperatures and humidity levels for installation and curing of materials.

5. Provide adequate ventilation to meet health regulations for safe working environment.

2. Temperatures Required

    1. Generally, 24 hours a day: Minimum of 40 degrees F.

    2. 24 hours a day during placing, setting and curing of cementitious materials: As required by specification section for each product.

    3. 24 hours a day, seven days prior to, and during, placing of interior finishes: woodwork, resilient floors, painting and finishing: As required by specification section for each product.

    4. 24 hours a day after application of finishes, and until Substantial Completion: Minimum of 50 degrees F.

3. Ventilation Required:

    1. Contractors shall prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction.

        1. Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas.

        2. Dispose of exhaust materials in manner that will not result in harmful dispersal of hazardous substances into atmosphere of occupied areas.

        3. Continuously ventilate storage spaces containing hazardous or volatile materials.

    2. Contractors shall provide adequate ventilation for:

        1. Curing installed materials.

        2. Dispersal of humidity.

        3. Temporary sanitary facilities.

    3. Duration of Operations:

        1. For Personnel:

            1. At all times personnel occupy an area subject to hazardous accumulations of harmful elements.

            2. Continue operation of ventilation and exhaust system for time after

cessation of work process to assure removal of harmful elements.

2. For curing installed materials: As required by specification section for respective materials.

3. For humidity dispersal: Continuously ventilate to provide suitable ambient conditions for work.

4. The Construction Manager shall maintain strict supervision of operation of temporary heating and ventilating equipment in order to:

    1. Enforce conformance with applicable codes and standards.

    2. Enforce safe practices.

    3. Prevent abuse of services.

1.4 COSTS OF INSTALLATION AND OPERATION

1. The Contractor shall be responsible for all installation and operating costs for any heat and ventilation as required in this section until the permanent HVAC system is in operation.

2. After the permanent HVAC system is operational, the Owner will pay the costs of fuel for temporary heat and ventilation. The Contractor will pay the costs for maintaining the system until final acceptance by the Owner.

3. The Contractor shall be responsible for all installation and operating costs for any heat required to supplement that which is to be supplied by the Construction Manager in 1.3, above.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

1. The Construction Manager will obtain and pay for permits as required by governing authorities for those activities required by this Section.

2. Contractor shall comply with Federal, State and local codes, and utility company regulations.

2. PRODUCTS

2.1 MATERIALS

1. General

1. Materials may be new or used, but must be adequate for purposes intended and must not create unsafe conditions nor violate requirements of applicable codes.

2.2 EQUIPMENT

1. Standard products, meeting code requirements.

2. Provide required facilities, including piping, wiring and controls.

3. Portable Heater: Standard Units, meeting code requirements.

1. Safety Controls against explosion, overheating, and carbon monoxide build up.

2. Vent direct-fired units to outside.

3. Provide adequate combustion air.

4. Oil-Fired heaters will not be allowed.

3. EXECUTION

3.1 GENERAL

1. Comply with applicable sections of Division 15 - Mechanical.

2. Install work in neat and orderly manner.

3. Make structurally, mechanically and electrically sound throughout.

4. Maintain to give safe, continuous service at required times and to provide safe working conditions.

5. Modify and extend system as work progress requires.

3.2 INSTALLATION

1. Locate units to provide equitable distribution of heat and air movements.

2. Locate to avoid interference with, or hazards to:

1. Work or movement of personnel.

2. Traffic areas.

3. Materials handling.

4. Storage areas.

5. Work of other Contractors.

6. Finishes.

3.3 OPERATION OF PERMANENT EQUIPMENT

1. The Construction Manager will coordinate with Contractor.

2. The Contractor will place permanent HVAC system in operation only upon written authorization by the Construction Manager.

3. Before operating the permanent HVAC equipment, the Contractor shall confirm to the Construction Manager that:

    1. Inspection has been made by proper authorities.

    2. Systems, equipment piping, strainers, filters and associated operating items are sufficiently complete, cleaned, and ready for operation.

    3. Controls and safety devices are complete and tested, or adequate temporary controls are provided.

    4. Before operating the permanent HVAC equipment, the Contractor shall install temporary filters:

        1. For air handling units.

        2. For permanent ducts.

3.4 REMOVAL

1. The Contractor shall completely remove temporary materials and equipment when no longer required, or on completion of construction.

2. The Contractor shall clean and repair damage caused by temporary installation, and restore equipment to specified or original condition.

3. The Contractor shall remove temporary filters and install new filters, or clean permanent filters, in the permanent HVAC system prior to final acceptance by the Owner.

END OF SECTION

SECTION 015200 - CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

1. GENERAL

1.1 DESCRIPTION

1. Construction Manager and Contractors shall provide all temporary facilities throughout the construction period unless otherwise indicated in the Contract Documents.

2. Construction Manager and Contractors shall pay all costs for providing, maintaining and removing of all temporary facilities unless otherwise indicated in the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

1. Temporary Electric: Section 015113.

2. FACILITIES

2.1 TEMPORARY SANITATION FACILITIES

1. Construction Manager will provide and maintain sanitary facilities for all personnel on the project.

2. The number of sanitary facilities required shall be based on the total number or workers employed on the site and shall be in accordance with the provisions of the applicable code.

3. Construction Manager will maintain sanitary facilities in a sanitary and clean condition at all times.

2.2 TEMPORARY WATER

1. Drinking Water: Contractor shall provide potable water for drinking purposes for all his personnel on the site. He shall furnish disposable drinking cups at water stations. Each water station shall be equipped with a suitable trash container for disposal of the drinking cups.

2. Construction Water: Construction Manager will provide and maintain tap locations for construction water of sufficiently pure and potable quality to avoid deleterious effect on any materials used. Location of construction water tap locations will be determined by the Construction Manager depending on the stage of construction of the incoming water service. Contractor shall provide

and maintain all hoses, piping and valves as required for obtaining construction water from taps provided by the Construction Manager.

2.3 TEMPORARY TELEPHONES

1. Construction Manager will not provide any telephones or fax machines for Contractor's personnel. Each Contractor is responsible for its own phones and fax machines.

2.4 FIELD OFFICE

1. During the period of the Work and until final acceptance of the project, the Construction Manager will provide a weatherproof building for the Construction Manager's Field Project Manager(s) and Superintendent(s). Contractor shall make provisions for its own field office, subject to approval by the Construction Manager.

2.5 FIRE PROTECTION

1. The Carpentry & General Work Contractor will provide and maintain temporary portable fire extinguishers on each floor level and building area. Number to conform to applicable codes.

2. Contractor shall provide additional fire extinguishers as required by OSHA regulations for its work.

3. Fire extinguishers shall be 10lb, Multi-Purpose (ABC) dry chemical, UL labeled, with a rating of 3a:40bc.

2.6 ACCESS ROADS AND PARKING AREAS

1. Neither the Construction Manager nor the Owner will provide parking for Contractor's personnel on or about the project site. All parking provisions required for Contractors will be solely the responsibility of the Contractors or their personnel.

2.7 STORAGE AREAS

1. The Construction Manager will assign storage areas on the site. Storage areas are extremely limited and will be assigned in a manner which will best facilitate the work.

2. Contractor shall provide all other storage space required for its work at off-site locations.

3. All combustible or flammable materials must be safely stored in a secured area in strict accordance with regulations, codes and laws enforced by local, State or Federal agencies, whichsoever is the most stringent.

2.8 FIRST AID STATION

1. The Construction Manager will provide and maintain an unmanned first aid station for all personnel in his jobsite office.

2.9 SECURITY

1. The Construction Manager will provide the following security measures at the site: security lighting will be provided.

2. All other safety and security measures shall be the responsibility of each Contractor. These measures shall include but are not limited to the provision of secured storage for tools, construction equipment, and materials and equipment scheduled for installation in the building.

2.10 BENCH MARKS AND BASELINE

1. The Construction Manager will lay out and establish and maintain bench marks and baselines.

2. The Contractor shall lay out his own work and shall be responsible for the accuracy of same.

3. Each Contractor shall check grades, lines, levels and dimensions as shown on the drawings and shall promptly report errors or inconsistencies in same to the Construction Manager before Work proceeds.

4. The Contractor is responsible for damaging or altering the bench marks and baselines established by the Construction Manager and shall bear the costs of replacing same.

2.11 FIELD OFFICE AND STORAGE TRAILERS

1. Each Contractor shall provide and maintain its own field office and storage trailers as required.

2. Each Contractor shall provide temporary heat and power for its field office and storage trailer.

3. Each Contractor's field offices and storage trailers shall be located as directed by the Construction Manager.

2.12 PROJECT SIGN

1. The Construction Manager will provide a Project Sign naming the major participants, as determined by the Owner.

2.13 TRASH DISPOSAL

1. Each Contractor shall be responsible for clean up and depositing its common trash in the dumpsters provided by the Construction Manager.

2. The Construction Manager will not provide a trash chute.

3. The Construction Manager will provide dumpsters, and will arrange for disposal of common, non-hazardous, work-related trash deposited in these dumpsters.

2.14 HOISTING

1. Contractor shall provide its own materials hoists and cranes. No personnel hoist will be provided.

2.15 SCAFFOLDING AND WORKING PLATFORMS

1. No scaffolding shall be provided by the Construction Manager. Each Contractor shall provide all scaffolding required to perform its Work.

2.16 SAFETY BARRICADES AND RAILINGS

1. The Structural Contractor shall provide barricades around elevator, stair, shaft and cut openings in floors and roofs, and edges of floors and roofs. All barricades shall at a minimum, be constructed of two runs of 1/2" diameter wire rope cable with adequate turn-buckle and eyes such that no more than 60' of cable need be loosened or removed at any given location for access. All cables shall be installed such that no more than 3" of deflection of the cable is achieved at any point between supports. The methods and materials used in barricading shall be in accordance with OSHA and local code regulations, and shall be approved by the Construction Manager prior to installation. Barricades will be installed immediately after the installation of the floor slab on any level or part of a level on the Building. Until a level has been fully barricaded, the Structural Contractor will be responsible for maintenance of the barricades. After a level has been fully barricaded, the Construction Manager will assume maintenance of

the barricades until a subsequent contractor requires the barricades to be removed in order to accomplish his work, at which time that contractor will assume maintenance of the barricades.

2. After the barricades are no longer needed, the Construction Manager will remove the barricades from the site. The Construction Manager will determine the location and scheduling of barriers to be removed.

3. Each Contractor shall provide for its own barricades at all other trenches, excavations, and locations not specifically identified in Paragraph 1 above.

4. Contractors who remove barricades shall be responsible for replacing them. If, after proper notification, in writing, from the Construction Manager the responsible Contractor does not correct his deficiencies in safety barricade placement, the Construction Manager reserves the right to undertake this work and backcharge the responsible Contractor(s).

5. During the execution of his work, Contractor will provide daily maintenance of, and upon completion of same, restore all barricades in a manner acceptable to prevailing safety standards enforced by local, State or Federal ordinance, whichsoever is most stringent. The intent is to leave no floor penetration or perimeter opening in an unsafe condition.

6. The Construction Manager shall arrange for temporary ladders required for access to each of the floor levels after the completion of floor slab work, and until the final stairs are ready for use.

2.17 PUMPING AND DRAINAGE

1. Each Contractor shall provide its own pumping and drainage.

2. When an area is released by one Contractor to another, the Contractor releasing an area shall be responsible for leaving it in a drained condition. The incoming Contractor shall assume responsibility for drainage on the day that he is scheduled to start work in the area. If the incoming Contractor is late in starting work, he shall assume responsibility for pumping and drainage arising as a result.

2.18 TEMPORARY BUILDING ENCLOSURES

1. The Construction Manager will equip all temporary exterior doors of the building with self-closing hardware and padlocks.

2. All other temporary enclosures and protection shall be provided by the Contractor requiring the protection.

3. Temporary enclosures required due to late delivery of materials or untimely installation of work shall be the responsibility of the Contractor responsible for the delay.

2.19 TEMPORARY POWER AND LIGHTING

1. EachContractor shall provide all extension cords and outlets as required for obtaining electric power from power centers provided by the Electrical Contractor. Refer to Section 015113 - TEMPORARY ELECTRIC.

2. Each Contractor shall provide its own additional temporary lighting of sufficient lighting levels to properly install his work.

2.20 TEMPORARY HEAT

1. Each Contractor shall provide temporary heat as required for its operations. Once a building has reached the "Permanent Enclosure" stage, temporary heat will be provided as specified in Section 015123 - TEMPORARY HEAT AND VENTILATION.

2. Equipment and methods of temporary heating shall be satisfactory to the Construction Manager.

2.21 PROTECTION OF ADJACENT MATERIALS

1. Each Contractor shall protect adjacent materials and finishes from damage as a result of its work.

2.22 CLEAN UP

1. Each Contractor shall arrange for clean up and removal of debris resulting from its operations, and shall dispose of debris in accordance with the provisions of Paragraph 2.13 above. Clean up shall be scheduled on a continual basis to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and trash, but in any case not less than once a week.

2. The Contractor will ensure that all waste materials that are combustible or flammable will be removed from the building at the end of each work day. All trash considered to be edible by rodent will be disposed of in metal containers and removed by the end of the work day.

3. At completion of its Work, each Contractor shall remove waste materials, rubbish, tools, equipment, and clean up all exposed surfaces in preparation for final cleaning.

4. If, after notification in writing from the Construction Manager, the Contractor does not correct its deficiencies in housekeeping within twenty four (24) hours, the Construction Manager reserves the right to undertake the Work and to backcharge the Contractor.

5. Final clean up prior to Owner occupancy shall be arranged for by the Construction Manager.

2.23 DUST PROTECTION

1. Each Contractor shall erect and maintain dust proof protection whenever its operations will produce dust and dirt that might filter through the building into occupied or finished areas. Contractor shall be responsible for all cleaning required due to its failure to provide such dust protection.

2.24 PROTECTION OF EXISTING CONSTRUCTION

1. Each Contractor shall be responsible for all damage that it may cause to materials and equipment stored or installed by other Contractors.

2.25 OTHER

1. Each Contractor shall provide any other Temporary Facilities and services that it requires and which are not specifically identified above.

3. PERMITS

3.1 The Construction Manager will obtain the Building Permit. All other permits are to be obtained and paid for by the Contractor requiring them.

4. EXECUTION

4.1 GENERAL

1. Each Contractor shall install all temporary facilities in accordance with applicable codes.

2. Each Contractor shall maintain temporary facilities for which it is responsible throughout the construction period.

3. Each Contractor shall remove all temporary facilities for which it is responsible when they are no longer required or when the Construction Manager directs the removal of same.

4. Each Contractor shall repair all damage to the Project Site caused by the installation of its temporary facilities.

END OF SECTION

SECTION 016200 - MATERIAL AND EQUIPMENT

1. GENERAL CONDITIONS

1.1 The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate apply to the Work specified in this Section.

1.2 Where work is to be executed under Separate Prime Contracts, the provisions of this Section apply to each Contract.

2. REQUIREMENTS INCLUDED

2.1 All materials and equipment incorporated into the Work shall:

1. be new;

2. conform to applicable specifications and standards; and

3. comply with size, make, type and quality specified, or as specifically approved in writing by the Architect.

2.2 Manufactured and Fabricated Products shall conform to the following requirements:

1. Designed, fabricated and assembled in accord with the best engineering and shop practices.

2. Manufactured like parts of duplicate units to standard sizes and gauges, to be interchangeable.

3. Two or more items of the same kind shall be identical, by the same manufacturer.

4. Products shall be suitable for service conditions.

5. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

2.3 Contractor shall not use materials or equipment for any purpose other than that for which it is designated or is specified.

2.4 Materials removed form existing structures shall not be reused in the completed work unless specifically indicated or specified.

2.5 For materials and equipment specifically indicated or specified to be reused in the

Work:

1. Contractor shall use special care on removal, handling storage and reinstallation, to assure proper function in the completed Work.

2. Arrange for transportation, storage and handling of products which require off-site storage, restoration or renovation. Pay all costs for such work.

3. MANUFACTURER'S INSTRUCTIONS

3.1 When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, Contractor shall obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Construction Manager.

1. Maintain one set of complete instructions at the job site during installation and until completion.

3.2 Contractor shall handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, Contractor shall consult with Construction Manager for further instructions.

2. Contractor shall perform work in accord with manufacturer's instructions. Contractor shall not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

4. TRANSPORTATION AND HANDLING

4.1 Contractor shall arrange deliveries of Products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver Products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Contractor shall immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that Products are properly protected and undamaged.

4.2 Contractor shall provide equipment and personnel to handle Products by methods to prevent soiling or damage to Products or packaging.

5. STORAGE AND PROTECTION

5.1 Contractor shall store Products in accord with manufacturer's instructions, with seals and labels intact and legible.

1. Contractor shall store Products subject to damage by the elements in weathertight enclosures.

2. Contractor shall maintain temperature and humidity within the ranges required by manufacture's instructions.

5.2 Exterior Storage

1. Contractor shall store fabricated Products above the ground, on blocking or skids, to prevent soiling or staining. Cover Products which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

2. Contractor shall store loose granular materials in a well-drained area on soiled surfaces to prevent mixing with foreign matter.

5.3 Contractor shall arrange storage in a manner to provide easy access for inspection. Contractor shall make periodic inspections of stored Products to assure that Products are maintained under specified conditions, and free from damage or deterioration.

5.4 Contractor shall store flammable materials so as to prevent contact with flames and fire. Conform with manufacturer's recommendations and local laws. Pay particular attention to storage of:

1. Roof insulation.

2. Roofing materials, including solvents.

3. Paint materials.

4. Cleaning and other solvents.

5. Fuels.

5.5 Protection after Installation:

1. Contractor shall provide substantial coverings as necessary to protect installed Products from damage from traffic and subsequent construction operations. Remove when no longer needed.

6. SUBSTITUTIONS AND PRODUCT OPTIONS

6.1 Product List.

1. Within 30 days after Contract Date, Contractor shall submit to Construction Manager a complete list of major products proposed to be used, with the name of the manufacturer and the installing Contractor.

6.2 Contractor's Options.

1. For Products specified only by reference standard, Contractor shall select any Product meeting that standard.

2. For Products specified by naming several Products or manufacturers, Contractor shall select any one of the Products or manufacturers named which complies with the specifications.

3. For Products specified by naming one or more Products or manufacturers and "or equal", Bidders must, during the bidding period, submit a request for substitutions for any Product or manufacturer not specifically named. See provisions in Paragraph 1.6.3.

4. For Products specified by naming only one Product and manufacturer, there is no option; and Contractor shall provide the precise Product specified.

6.3 Substitutions.

1. Until a date no later than seven (7) days before the date Bids are due, Architect will consider written requests from bidders for substitution of Products. **The contractor will submit any substitution requests to the Construction Manager for transmittal to the Architect. The** architect will review requests and will notify Bidders in an Addendum if the requested substitution is acceptable.

2. Should the Bidder desire a substitution, it shall submit a separate request for each Product, supported with complete data, with drawings and samples as appropriate, including:

   1. Comparison of the qualities of the proposed substitution with that specified.

   2. Changes required in other elements of the Work because of the substitution.

   3. Effect on the construction schedule.

4. Cost data comparing the proposed substitution with the Product specified.

5. Any required license fees or royalties.

6. Availability of maintenance service, and source of replacement materials.

3. Architect, in its sole discretion, shall be the judge of the acceptability of the proposed substitution.

4. A request for a substitution constitutes a representation that Bidder:

1. has investigated the proposed Product and determined that it is equal to or superior in all respects to that specified;

2. will provide the same warranties or bonds for the substitution as for the Product specified;

3. will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the Work complete in all respects; and

4. waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

6.4 Architect will review requests for substitutions with reasonable promptness, and notify Bidders, in writing, through the Construction Manager, of the decision to accept or reject the requested substitution. Any decision to accept a substitution must be confirmed in an Addendum issued during the bidding period in order to be valid. Oral approvals will not be binding.

END OF SECTION

SECTION 017329 - CUTTING AND PATCHING

1. GENERAL

1.1 Definition: "Cutting and Patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

1.2 Refer to Other Sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

1.3 Structural Work: Do not cut and patch structural work in a manner resulting in a reduction of load carrying capacity or load deflection ratio. Submit proposal and request and obtain Architect's/Engineer's approval before proceeding with cut and patch of structural work.

1.4 Operational/Safety Limitations: Do not cut and patch operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance. Submit proposals and requests and obtain Architect's/Engineer's approval before proceeding with cut and patches of structural work.

1.5 Visual/Quality Limitations: Do not cut and patch work exposed to view (exterior and interior) in manner resulting in noticeable reduction of aesthetic qualities and similar qualities, as judged by Architect/Engineer.

1. Engage the original Installer/Fabricator, or (if not available) an acceptable equivalent entity, to cut and patch the following categories of exposed work but not limited to
2. Exterior wall materials, ie., curtain wall
3. Finish floor materials, ie., substrate, carpet, ceramic tile
4. Walls
5. Ceilings

1.6 Limitation on Approvals: Architect's/Engineer's approval to proceed with cutting and patching does not waive right to later acquire removal/replacement of work found to be cut and patched in an unsatisfactory manner, as judged by Architect/Engineer.

2. MATERIALS

2.1 General: Use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual

effect. Use materials for cutting and patching that will result in equal or better performance characteristics.

3. EXECUTION

3.1 Inspection: Before cutting, examine surfaces to be cut and patched and conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

3.2 Temporary Support: To prevent failure provide temporary support of work to be cut.

3.3 Protection: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

1. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

2. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.4 Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

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

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

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

END OF SECTION

SECTION 017700 – CONTRACT CLOSEOUT

1. DESCRIPTION OF REQUIREMENTS

1.1 Provisions of this section apply to the procedural requirements for the actual close out of the Work, not to the administrative matters such as final payment or the change over of insurance. Close out requirements relate to both substantial and final completion of the Work; they also apply to individual portions of completed work as well as the Total work. Specific requirements contained in other sections have precedence over the general requirements contained in this section.

2. PROCEDURES AT SUBSTANTIAL COMPLETION

2.1 Prerequisites: Contractor shall comply with the General Conditions and complete the following before requesting inspection of the Work, or a designated portion of the Work, for certification of substantial completion:

1. submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates, releases of liens, tax certification and similar required documentation for specific units of work, and documents needed to enable Owner's unrestricted occupancy and use;

2. submit record documentation, maintenance manuals, tools, spare parts, keys and similar operational items;

3. complete instructions of Owner's operating personnel, and start up of systems; and

4. complete final cleaning and remove temporary facilities and tools.

2.2 Inspection Procedures: Upon receipt of Contractor's request, Architect/Engineer will either proceed with inspection or advise Construction Manger of prerequisites not fulfilled. Following initial inspection, Architect/Engineer will either prepare certificate of substantial completion, or advise Construction Manager of work which must be performed prior to issuance of certificate. The Architect/Engineer will repeat the inspection when requested and assure that the work has been substantially completed. Results of the completed inspection will form the initial "punch list" for final acceptance.

2.3 Punch List Procedures: Each Contractor shall be given a copy of the punch list with its appropriate work identified. Each Contractor shall be given 9 (nine) calendar work days to complete their punch list work. On the 10th day or as determined by the Construction Manager the Construction Manager shall employ other Contractors, as required, to complete any incomplete punch list work and retain from the appropriate

Contractors retainage all costs incurred.

3. PROCEDURES AT FINAL ACCEPTANCE

3.1 Reinspection Procedure: The Architect/Engineer will reinspect the Work upon receipt of the Contractor's notice that, except for those items whose completion has been delayed due to circumstances that are acceptable to the Architect/Engineer, the Work has been completed, including punch list items from earlier inspections. Upon completion of reinspection, the Architect/Engineer will either recommend final acceptance and final payment, or will advise the Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, this procedure will be repeated.

4. CLOSEOUT DOCUMENTATION

4.1 Record Drawings: Contractor shall maintain a complete set of either blue or black line prints of the contract documents and shop drawings for record mark up purposes throughout the Contract Time. Contractor shall mark up these drawings during the course of the Work to show both changes and the actual installation, in sufficient detail to form a complete record for Owner's purposes giving particular attention to work that will be concealed and difficult to measure and record at a later date, and Work which may require servicing or replacement during the life of the project. Require the entities marking prints to sign and date each mark up. Bind prints into manageable sets, with durable paper cover, appropriately labeled.

4.2 Installation, Operation and Maintenance Manual: Contractor shall provide 3-ring vinyl covered binders containing required maintenance manuals, properly identified and indexed and including operating and maintenance instructions extended to cover emergencies, spare parts, warranties, inspection procedures, diagrams, safety, security, and similar appropriate data for each system of equipment item.

4.3 State Tax Certification: Contractor shall provide recent Delaware State Tax Certification form as issued by State of Delaware, Department of Finance, Division of Revenue, Carvel State Office Building, 820 N. French Street, Wilmington, Delaware 19801.

4.4 AIA Documents: Contractors shall provide the following AIA documents with their final payment application submission:

- AIA G732, Application for Payment for 100% Complete
- AIA G732, Final Application for Payment for Retainage
- AIA G704-CMA, Certificate of Substantial Completion – 4 originals
- AIA G706, Affidavit of Payment of Debts & Claims
- AIA G706A, Affidavit of Release of Liens

- AIA G707, Consent of Surety

4.5 Release of Liens: Contractors shall provide the following release of liens with their final payment application submission:

- Prime Contractor's Release of Liens
- Subcontractors' & Suppliers' Release of Liens (major subs and suppliers)

5. GENERAL CLOSE OUT REQUIREMENTS

5.1 Operator Instruction: Contractor shall require each Installer of systems requiring continued operation and maintenance by Owner's operating personnel, to provide on location instruction to Owner's personnel, sufficient to ensure safe, secure, efficient, non-failing utilization and operation of systems. Contractor shall provide instructions for the following categories of work:

1. Mechanical/electrical/electronic systems (not limited to work of Division 15 and 16).
2. Roofing, flashing, joint sealers.
3. Floor Finishes
4. Door Hardware

6. FINAL CLEANING

6.1 At the time of project close out Contractor shall clean or reclean the Work to the condition expected from a normal, commercial building cleaning and maintenance program. Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of substantial completion:

1. Remove non-permanent protections and labels.
2. Polish glass.
3. Clean exposed finishes.
4. Touch up minor finish damage.
5. Clean or replace mechanical systems filters.
6. Remove debris.
7. Broom clean unoccupied spaces.
8. Sanitize plumbing and food service facilities.
9. Clean light fixtures and replace burned out lamps.
10. Sweep and wash paved areas.
11. Police yards and grounds.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Floors and slabs on grade.

C. Joint devices associated with concrete work.

D. Miscellaneous concrete elements, including concrete slab patching.

E. Concrete curing.

1.02 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

E. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

F. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2011.

G. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

H. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2011a.

I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2012.

J. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

K. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.

L. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999 (Reapproved 2008).

M. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2011.

N. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

1.03 SUBMITTALS

A. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

B. Samples: Submit samples of underslab vapor retarder to be used.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

PART 2 PRODUCTS

REINFORCEMENT

Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.

1. Form: Flat Sheets.
2. Mesh Size: 6 x 6.
3. Wire Gage: W 4 x W 4.

A. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

CONCRETE MATERIALS

Cement: ASTM C150, Type I - Normal Portland type.

Fine and Coarse Aggregates: ASTM C 33.

Lightweight Aggregate: ASTM C 330.

Water: Clean and not detrimental to concrete.

ACCESSORY MATERIALS

Underslab Vapor Retarder: complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs.

1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
2. Products:
   a. Insulation Solutions, Inc; Viper VaporCheck II 15-mil (Class A): www.insulationsolutions.com.
   b. Stego Industries, LLC; Stego Wrap Vapor Barrier 15-mil (Class A): www.stegoindustries.com.
   c. W.R. Meadows, Inc.; PERMINATOR Class A - 15 mils: www.wrmeadows.com.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

Moisture-Retaining Cover: ASTM C 171; regular curing paper, white curing paper, clear polyethylene, white polyethylene, or white burlap-polyethylene sheet.

2.01 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059 Type II.

B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

CONCRETE MIX DESIGN

Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.
Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

Normal Weight Concrete:
Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 psi.

2.02 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

2.02 PREPARATION

A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use latex bonding agent only for non-load-bearing applications.

B. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

PLACING CONCRETE

Place concrete in accordance with ACI 304R.

Place concrete for floor slabs in accordance with ACI 302.1R.

A. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

2.03 SLAB JOINTING

A. Locate joints as indicated on the drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

2.04 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 ft.
   2. Under Seamless Resilient Flooring: 1/4 inch in 10 ft.
   3. Under Carpeting: 1/4 inch in 10 ft.

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

CURING AND PROTECTION

Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

Surfaces Not in Contact with Forms:

Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-fog spray, or saturated burlap.

Final Curing: Begin after initial curing but before surface is dry.

Moisture-Retaining Cover: Seal in place with waterproof tape or adhesive.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Concrete Block.
   1. Standard concrete masonry units.

C. Mortar and Grout.

D. Reinforcement and Anchorage.

E. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; American Concrete Institute International; 2011.

B. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.

C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a.

D. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.

E. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

F. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).

G. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2012.

H. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

I. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

J. ASTM C652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale); 2012.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Regional Materials: Provide CMUs that have been manufactured within 500 miles of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
   2. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   3. Special Shapes: Provide non-standard blocks configured for other detailed conditions.
      a. Provide square edge blocks for corners scheduled to receive tile or other finishes.
   4. Load-Bearing Units: ASTM C90, normal weight.
      a. Hollow block.
      b. Exposed faces: Manufacturer's standard color and texture.

2.02 BRICK UNITS

A. Facing Brick: ASTM C216, Type FBS, Grade SW.
   1. Color and texture: Match existing with new or salvaged bricks.
   2. Actual size: Match existing.
   3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

2.03 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91, Not Permitted.

B. Portland Cement: ASTM C150, Type I; color as required to produce approved color sample.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. Water: Clean and potable.

2.04 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: Truss type; ASTM A 82/A 82M steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

2.05 FLASHINGS

A. Flexible Flashing with Elvaloy KEE: Solid-phase flexibilizer added to membrane flashing.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc; Flex-Flash Flashing: www.h-b.com.

B. Shelf Angles & Lintels: Flashing must be carried through the wall to prevent water from bypassing flashing.

C. Shelf Angle Soft Joints: Flashing Membrane or Drip must be compatible with wet sealant. Provide letter from flashing manufacturer addressing sealant compatibility.

D. Lap Sealant: Butyl type as specified in Section 07 90 05.

2.06 ACCESSORIES

A. Preformed Control Joints: Neoprene material. Provide with corner and tee accessories, fused joints.

B. Joint Filler: Closed cell neoprene; oversized 50 percent to joint width; self expanding; 3.5 inch wide x by maximum lengths available.
   1. Manufacturers:
      a. Williams Products, Inc.; Product Type NN1, 1040 Series.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Weeps: Open Head Joints.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Grout: ASTM C476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that related items provided under other sections are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 COURSING

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

C. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

3.03 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

3.04 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

B. Extend stainless steel drip edge of flexible flashings beyond 1/4 inch of exterior face of masonry.

3.05 LINTELS

A. Install loose steel lintels over openings.

3.06 CONTROL AND EXPANSION JOINTS

A. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.07 CUTTING AND FITTING

A. Cut and fit for chases, pipes, and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.08 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.09 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

A. Section 09 90 00 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2010.

E. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2009.

F. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2012.

G. ASTM B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes (Metric); 2012.

H. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012e1.

I. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric); 2012e1.

J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.

K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2012.

L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.

M. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.

N. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; American Welding Society; 2008.

O. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

P. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.

C. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.

D. Bolts, Nuts, and Washers: Stainless steel.

E. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Lintels: As detailed; galvanized finish.

2.05 MANUFACTURED PRODUCTS

A. Aluminum stair and landing:
   1. Standard treads with open risers, stringers and handrail and guardrail.
   2. Standard landing with guard rails.
   3. Non-slip finish on walking surfaces.
   4. Provide support posts, base plates, rise and run to suit field condition.

5. Product: AMST "CODE" line as manufactured by Architectural Metals of Southwest Florida.

2.06 FINISHES - STEEL

A. Prime paint all steel items.
   1. Exceptions: Galvanize items to be embedded in concrete or masonry.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Prime Painting: One coat.

2.07 FINISHES - ALUMINUM

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.08 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Fire retardant treated wood materials.

C. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2010.

D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

B. Fire Retardant Treatment:
   1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. All interior rough carpentry items are to be fire retardant treated.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 74 19.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Finish carpentry items.

C. Hardware and attachment accessories.

1.02 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.

C. PS 1 - Structural Plywood; 2007.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide data on fire retardant treatment materials and application instructions.
   2. Provide instructions for attachment hardware and finish hardware.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Provide the information required by AWI/AWMAC/WI Architectural Woodwork Standards.

D. Samples: Submit two samples of solid surface material, 6 x 6 inch in size.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards for Premium Grade.

B. Interior Woodwork Items:

2.02 LUMBER MATERIALS

A. Hardwood Lumber: Red Oak species, plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

2.03 SHEET MATERIALS

A. Softwood Plywood Not Exposed to View: Any face species, veneer core; PS 1 Grade A-B; glue type as recommended for application.

2.04 SOLID SURFACE MATERIALS

A. Solid Surfacing Material: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch, minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISSFA-2 and NEMA LD 3; acrylic or polyester resin, unfilled, and pigments; homogenous, non-porous and

capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.

a. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E84.
b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
c. Color and Pattern: As selected by Architect from manufacturer's full line.
d. Manufacturers:
    1) Dupont : www.corian.com.
    2) Formica Corporation : www.formica.com.
    3) Wilsonart International, Inc : www.wilsonart.com.
    4) Substitutions: See Section 01 60 00 - Product Requirements.

2.05 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

B. Fasteners: Of size and type to suit application; zinc plated finish in concealed locations and stainless steel finish in exposed locations.

C. Concealed Joint Fasteners: Threaded steel.

2.06 ACCESSORIES

A. Lumber for shimming and blocking of infill panel.

2.07 WOOD TREATMENT

A. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.02 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 07 24 00
EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Composite wall cladding of rigid insulation and reinforced finish coating ("Class PB").

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate wall joint patterns, joint details, and molding profiles.

C. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.

D. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.03 QUALITY ASSURANCE

A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site at all times during installation.

B. EIFS Manufacturer Qualifications: Provide all EIFS products other than insulation from the same manufacturer with qualifications as follows:

C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

D. Installer Qualifications: Company specializing in EIFS work, with not less than 5 years of documented experience, and approved by the EIFS manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Protect adhesives and finish materials from freezing and temperatures in excess of 90 degrees F.

1. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
2. Protect insulation materials from exposure to sunlight.

1.05 FIELD CONDITIONS

A. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

B. Do not install coatings or sealants when ambient temperature is below 40 degrees F.

C. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Basis of Design: Dryvit Systems, Inc; Dryvit Outsulation Plus MD Exterior Insulation and Finish System, Class PB with Moisture Drainage: www.dryvit.com.
2. Parex USA, Inc.; Parex Standard WaterMaster EIFS: www.parex.com.

3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 EXTERIOR INSULATION AND FINISH SYSTEM

A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on flat-backed insulation board adhesive-applied directly to water-resistive coating over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.

B. Fire Characteristics:
   1. Flammability: Pass, when tested in accordance with NFPA 285.
   2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
   3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.

C. Adhesion of Water-Resistive Coating to Substrate: For each combination of coating and substrate, minimum flatwise tensile bond strength of 15 psi, when tested in accordance with ASTM C297/C297M.

D. Adhesion to Water-Resistive Coating: For each combination of insulation board and substrate, when tested in accordance with ASTM C297/C297M, maximum adhesive failure of 25 percent unless flatwise tensile bond strength exceeds 15 psi in all samples.

E. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.

F. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.

G. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.

H. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC 219 or 235.

I. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycle 1, 5, or 9.

J. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.

K. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.

L. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 500 liters of sand.

2.03 MATERIALS

A. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.

1. Texture: Dryvit Systems, Inc.; Dryvit Textured Acyrlic Finishes (TAFS).
2. Color: As selected by Architect from manufacturer's full range.

B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh.

C. Insulation Board: Molded, expanded polystyrene board; ASTM C578, Type I; with the following characteristics:
1. Board Size: 24 by 48 inches.
2. Board Size Tolerance: plus/minus 1/16 inch from square and dimension.
3. Board Edges: Square.
4. Thermal Resistance (R factor per 1 in (25.4 mm)) at 75 degrees F: 3.60.
5. Board Density: 0.9 lb/cu ft.
6. Compressive Resistance: 10 psi.
7. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, when tested in accordance with ASTM E84.

D. Drainage Layer or Spacers: Furnished or approved by EIFS manufacturer; capable of achieving specified drainage rate; not required to be water-resistive, air retarder, or vapor retarder.

E. Water-Resistive Barrier: Fluid-applied coating forming air and water barrier membrane; applied to sheathing; furnished or approved by EIFS manufacturer.

2.04 ACCESSORY MATERIALS

A. Insulation Adhesive: Type required by EIFS manufacturer for project substrate.

B. Trim: EIFS manufacturer's standard PVC or rolled zinc trim accessories, as required for a complete project and including starter track and drainage accessories.

C. Sealant Materials: As recommended by EIFS manufacturer.

PART 3 EXECUTION

3.01 GENERAL

A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.

B. Where different requirements appear in either document, comply with the most stringent.

C. Neither of these documents supercedes the provisions of the Contract Documents that define the contractual relationships between the parties or the scope of work.

3.02 EXAMINATION

A. Verify that substrate is sound and free of oil, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.

B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.03 INSTALLATION - WATER-RESISTIVE BARRIER

A. Apply barrier coating as recommended by coating manufacturer; prime substrate as required before application.

B. Seal all substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.

C. At door and window openings, seal water-resistive barrier to rough opening structure before installation of metal flashings, sills, or frames, using method recommended by manufacturer.

D. Lap flashing tape at least 2 inches on each side of joint or transition.

E. Install drainage layer or spacers after flashing tape has been completed.

3.04 INSTALLATION - INSULATION

A. Install in accordance with manufacturer's instructions.

B. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.

C. On wall surfaces, install boards horizontally.

D. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.

E. Rasp irregularities off surface of installed insulation board.

F. Mechanical Fastening: Space fasteners as recommended by EIFS manufacturer.

G. Adhesive Attachment: Use method required by manufacturer to achieve drainage efficiency specified; do not close up drainage channels when placing insulation board.

3.05 INSTALLATION - FINISH

A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at all terminations of the EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.
   1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.
   2. Allow base coat to dry a minimum of 24 hours before next coating application.

B. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.

C. Apply sealant at finish perimeter and expansion joints in accordance with Section 07 90 05.

3.06 CLEANING

A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

3.07 PROTECTION

A. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Repair of elastomeric roofing membrane, ballasted conventional and ballasted protected membrane application.

C. Flashings.

D. Roofing stack boots.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers.

1.03 REFERENCE STANDARDS

A. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2008.

B. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2012.

C. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

D. SPRI RP-4 - Wind Design Standard for Ballasted Single-Ply Roofing Systems; Single Ply Roofing Institute; 2008 (ANSI/SPRI RP-4).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

E. Manufacturer's Field Reports: Indicate procedures followed and supplementary instructions given.

F. Warranty: Submit manufacturer's forms for repair completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 95 degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.09 WARRANTY

A. System Warranty: Preform work so as not to void manufacturer's existing system warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle SynTec; Sure-Seal EPDM: www.carlisle-syntec.com.
   2. Firestone Building Products Co: www.firestonebpco.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ROOFING - BALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: One ply membrane loose-laid over insulation with ballast.

B. Acceptable Insulation Types:
   1. Match existing.

C. Ballast: Comply with SPRI RP-4 for Category 1, Exposure A, using aggregate over entire surface.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D 4637.
   1. Thickness: 0.060 inch.
   2. Color: Black.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Flexible Flashing Material: Same material as membrane; conforming to the following:
   1. Thickness: 90 mil.
   2. Tensile Strength: 1,200 psi.
   3. Elasticity: 50 percent with full recovery without set.
   4. Color: Black.

2.04 BALLAST MATERIALS

A. No.4 Aggregate: Sound, hard, washed rounded river gravel, ASTM D448 Size Classification 4,3, 24, 2, or 1. Match existing ballast size.

2.05 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Membrane Adhesive: As recommended by membrane manufacturer.

C. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips are in place.

3.02 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

D. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

E. Around roof penetrations, seal flanges and flashings with flexible flashing.

F. Coordinate installation of roof drains and related flashings.

3.03 BALLAST INSTALLATION

A. Install ballast. Evenly distribute aggregate ballast.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

3.05 CLEANING

A. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

B. Repair or replace defaced or damaged finishes caused by work of this section.

3.06 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 54 00
THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Base Bid:
   1. Repair and patching of adhered system with thermoplastic roofing membrane.

B. Alternate:
   1. Replace existing ballasted EPDM roofing with fully adhered TPO Membrane.

C. Insulation, flat and tapered.

D. Flashings.

E. Roofing stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers.

1.03 ALTERNATES

A. Refer to Division 1 Section, Alternates, for description of work under this Section affected by alternates.

1.04 REFERENCE STANDARDS

A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2012.

B. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2011a.

C. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; 2007.

D. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials and conformation of compatability to existing membrane.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Warranty: Submit manufacturer's forms for repair completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section:
   1. Approved by membrane manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 95 degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.09 WARRANTY

A. System Warranty: Preform work so as not to void manufacturer's existing system warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermoplastic Polyolefin Membrane Materials:
   1. Carlisle SynTec; Sure-Weld TPO: www.carlisle-syntec.com.
   2. Firestone Building Products Co; UltraPly TPO: www.firestonebpco.com.
   3. GAF; EverGuard TPO: www.gaf.com.

B. Insulation:
   1. Atlas Roofing Corporation: www.atlasroofing.com.
   2. Carlisle SynTec; SecurShield Insulation: www.carlisle-syntec.com.
   3. GAF; EnergyGuard PolyIso Insulation: www.gaf.com.

2.02 ROOFING

A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.

B. Acceptable Insulation Types - Constant Thickness Application:
   1. Minimum 2 layers of polyisocyanurate board.

C. Acceptable Insulation Types - Tapered Application:
   1. Tapered polyisocyanurate board.

D. Cover Board:
   1. Fiberboard or exterior grade plywood.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:
   1. Material: Thermoplastic polyolefin (TPO) complying with ASTM D6878.
   2. Reinforcing: Internal fabric.
   3. Thickness: 0.060 inch, minimum.
   4. Sheet Width: Factory fabricated into largest sheets possible.
   5. Color: White.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Flexible Flashing Material: Same material as membrane.

2.04 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 1 and with the following characteristics:
   1. Compressive Strength: 16 psi
   2. Board Size: 48 x 96 inch.
   3. Board Thickness: 1-1/2 inch.
   4. Board Edges: Square.

2.05 ACCESSORIES

A. Prefabricated Roofing Expansion Joint Flashing: Sheet butyl over closed-cell foam backing seamed to galvanized steel flanges.

B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
   1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

D. Membrane Adhesive: As recommended by membrane manufacturer.

E. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

F. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

G. Sealants: As recommended by membrane manufacturer.

H. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
   1. Composition: Roofing membrane manufacturer's standard.
   2. Size: 18 x 18 inch.
   3. Surface Color: White or yellow.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.02 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.03 INSULATION - UNDER MEMBRANE

A. Attachment of Insulation:
   1. Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.

B. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

E. Do not apply more insulation than can be covered with membrane in same day.

3.04 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive to substrate at rate of 1.67 gal/square. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Install roofing expansion joints where indicated. Make joints watertight.
   1. Install prefabricated joint components in accordance with manufacturer's instructions.

H. Coordinate installation of roof drains and sumps and related flashings.

3.05 FIELD QUALITY CONTROL

A. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.06 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 71 00
ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Manufactured roof specialties, including copings and fascias.

1.02 ALTERNATES

A. Refer to Division 1 Section, Alternates, for description of work under this Section affected by alternates.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2011.

B. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

C. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; Single Ply Roofing Industry; 2003. (ANSI/SPRI ES-1)

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

D. Samples: Submit two appropriately sized samples of coping and roof edge.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual details.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Roof Edge Flashings and Copings:
   1. Basis of Design: W.P. Hickman Company; Extruded TerminEdge: www.wph.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COMPONENTS

A. Roof Edge Flashings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
   1. Configuration: Fasciaand edge securement for roof membrane;
   2. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable code.
   3. Material: Extruded aluminum, 0.08 inch thick, minimum.
   4. Finish: 70 percent polyvinylidene fluoride.
   5. Color: To match sanding seam metal roofing.
   6. Products:

a. W.P. Hickman Company; Extruded TerminEdge: www.wph.com.

B. Copings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners.
2. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-3 to positive and negative design wind pressure as defined by applicable code.

2.03 FINISHES

A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; metalic 3-coat, thermally cured fluoropolymer finish system; color as scheduled.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components in accordance with manufacturer's instructions.

B. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

C. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Manufactured curbs, equipment rails, and pedestals.

1.02 ALTERNATES

A. Refer to Division 1 Section, Alternates, for description of work under this Section affected by alternates.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 MANUFACTURED CURBS

A. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies:
   1. AES Manufacturing Inc.: www.aescurb.com.
   2. The Pate Company: www.patecurbs.com.
   3. Roof Products & Systems (RPS) by Commercial Products Group of Hart & Cooley, Inc: www.rpscurbs.com.

B. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies:
Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counterflashing, internal reinforcing, and top side and edges formed to shed water.
   1. Sheet Metal: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 ; G60 coating designation; 18 gage, 0.048 inch thick.
   2. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing insulation; 1:1 slope; minimum cant height 4 inches.
   3. Manufacture curb bottom and mounting flanges for installation directly on roof deck, not on insulation; match slope and configuration of roof deck.
   4. Provide the layouts and configurations shown on the drawings.

C. Curbs Adjacent to Roof Openings: Provide curb on all sides of opening, with top of curb horizontal for equipment mounting.
   1. Provide preservative treated wood nailers along top of curb.
   2. Insulate inside curbs with 1-1/2 inch thick fiberglass insulation.
   3. Height Above Finished Roof Surface: 6 inches, minimum.
   4. Height Above Roof Deck: 14 inches, minimum.

D. Equipment Rails: Two-sided curbs in straight lengths, with top horizontal for equipment mounting.
   1. Provide preservative treated wood nailers along top of rails.
   2. Height Above Finished Roof Surface: 6 inches, minimum.
   3. Height Above Roof Deck: 14 inches, minimum.

E. Pipe, Duct, and Conduit Mounting Pedestals: Vertical posts, minimum 8 inches square unless otherwise indicated.
   1. Provide sliding channel welded along top edge with adjustable height steel bracket, manufactured to fit item supported.
   2. Height Above Finished Roof Surface: 8 inches, minimum.
   3. Height Above Roof Deck: 14 inches, minimum.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 90 05
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

1.02 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2010.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2011.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2011a.

D. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005 (Reapproved 2011).

E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.06 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single or multi- component.
   1. Joint Movement Range: +/- 50 percent.
   2. Single component Product:
      a. Sikaflex 15LM manufactured by Sika Corporation.
   3. Multi-component Product:
      a. Dynatrol II manufactured by Pecora Corporation.

b. Sonolastic NP 2 manufactured by Sonneborn
4. Applications: Use for:
a. Control, expansion, and soft joints in masonry.
b. Joints between concrete and other materials.
c. Joints between metal frames and other materials.
d. Other exterior joints for which no other sealant is indicated.

C. Type 2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
1. Color: Colors as selected.
2. Applications: Use for:
a. Interior wall and ceiling control joints.
b. Joints between door and window frames and wall surfaces.
c. Other interior joints for which no other type of sealant is indicated.

D. Type 3 - Coal tar extended, fuel resistant polyurethane sealant: Not Used.

E. Type 4 - Fire Resistant Foam Sealant:
1. Manufacturers:
a. Dow Corning: Product: 3-6548 RTV Foam.

F. Type 5 - Exterior Expansion Joint Sealer: Not Used

G. Type 6 - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
1. Applications: Use for:
a. Joints between plumbing fixtures and floor and wall surfaces.
b. Joints between kitchen and bath countertops and wall surfaces.

H. Type 7 - Butyl Sealant: Not Used

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; open cell polyurethane or reticulated (soft) polyethylene; oversized 33 to 50 percent larger than joint width; Denver Foam manufactured by Backer Rod Manufacturing, Inc.

D. Fire Rated Joint Filler: Pre-engineered, patened, flexible, textile fiberglass roll material with a fiberglass matt facing, containing approximately 30 percent by weight unexpanded vermiculite; Ultra Block manufactured by Backer Rod Manufacturing, Inc.

E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve the following:
   1. Width/depth ratio of 2:1.
      a. Minumim joint depth: 1/4 inch; Maximum joint depth: 1/2 inch, unless otherwise required by manufacturer.
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

D. Install backer rod using blunt or rounded tool to a uniform (+/- 1/8 inch) depth without puncturingthe material.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

3.06 SCHEDULE

A. Exterior Joints for Which No Other Sealant Type is Indicated: Type 1; colors as selected.

B. Interior Joints for Which No Other Sealant is Indicated: Type 2; color as selected.

C. Penetrations of Fire Rated Construction: Type 1 with Ultra Block joint filler or Type 4.

D. Joints Between Plumbing Fixtures and Walls and Floors, and Between Countertops and Walls: Type 6.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Thermally insulated steel doors.

1.02 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.

E. ASTM C1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2011.

F. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

G. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
   2. Republic Doors: www.republicdoor.com.
   3. Steelcraft, an Ingersoll Rand brand: www.steelcraft.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.

3. Door Edge Profile: Beveled on both edges.
4. Door Texture: Smooth faces.
5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
8. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors :
1. Grade: ANSI A250.8 Level 4, physical performance Level A, Model 2, seamless.
2. Core: Polystyrene foam.
3. Top Closures for Outswinging Doors: Flush with top of faces and edges.
4. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
5. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363.

2.04 STEEL FRAMES

A. General:
1. Comply with the requirements of grade specified for corresponding door.
2. Finish: Same as for door.
3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

B. Exterior Door Frames: Fully welded.
1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
2. Weatherstripping: Separate, see Section 08 71 00.

2.05 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of hardware.

3.04 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Test sound control doors for force to close, latch, and unlatch; adjust as required to comply.

END OF SECTION

SECTION 08 50 50
OPERABLE ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Remove existing windows, (note that environmental work, if required, is not in contract)

B. Furnish and install new operable aluminum windows.

C. Coordinate with Owner's General Trades and other contractors.

1.02 RELATED WORK

A. Section 07900 Sealants

B. Section 08800 Glass and Glazing

1.03 SYSTEM DESCRIPTION

A. Performance Requirements: Provide aluminum window systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with test method indicated.
   1. Wind Loads: Completed window system shall withstand wind pressure loads normal to wall plane indicated:
      a. Exterior Walls:
         1) Positive Pressure: 25 PSF
         2) Negative Pressure: 25 PSF
      b. Interior Walls (Pressure Acting in Either Direction)
   2. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330-84 with allowable stress in accordance with AA Specifications for Aluminum Structures.
      a. Insulating Glazing: 3/4 inch maximum.
   3. Thermal Movement: Provide for thermal movement caused by 180 degrees F (82.2 degrees C) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.
   4. Air Infiltration: Completed window systems shall have 0.01-0.18 CFM/FT2 maximum allowable infiltration when tested in accordance with ASTM E 283-84 at differential static pressure of 6.24 PSF (75 Pa).
   5. Water Infiltration: No uncontrolled water other than condensation on indoor face of any component when tested in accordance with ASTM E 331-86 and E547-86 at a minimum test pressure differential of 9 PSF.

1.04 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Product Data: Submit product data for each type window series specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors and textures.

D. Samples: Submit verification samples for colors on actual aluminum substrates indicating full color range expected in installed system.

E. Quality Assurance/Control Submittals:
   1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

2. Installer Qualification Data: Submit installer qualification data.

F. Closeout Submittals:
1. Warranty: Submit warranty documents specified herein.
2. Project Record Documents: Submit project record documents for installed materials in accordance with Division 1 Project Closeout (Project Record Documents) Section.

1.05 QUALITY ASSURANCE

A. Qualifications:
1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to thatrequired for this project. If requested by Owner, submit reference list of completed projects.
2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.06 PROJECT CONDITIONS / SITE CONDITIONS

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.07 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Finish Warranty: Submit, for Owner's acceptance, manufacturer's standard 20 warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.
1. Beneficiary: Issue warranty in the legal name of the project Owner.
2. Warranty Period: 20 years commencing on Date of Substantial Completion
3. Warranty Acceptance: Owner is sole authority who will determine acceptability of manufacturer's warranty documents.

PART 2 PRODUCTS

2.01 MANUFACTURERS (ACCEPTABLE MANUFACTURERS/PRODUCTS)

A. Acceptable Manufacturers:
1. Traco: Model 2400
2. EFCO: Model 550 I
3. Winco: Model Series 1150 Thermal AW80

2.02 WINDOW MATERIALS

A. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 Aluminum Alloy.

B. Aluminum Sheet:
1. Painted Finish: ASTM B 209 (ASTM B 209M), 3003-H3 Aluminum Alloy, 0.080 inch minimum thickness.

2.03 WINDOW ACCESSORIES

A. Manufacturer's Standard Accessories:
1. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color.
2. Sealant: Non-skinning type, AAMA 803.3

3. Glazing: Setting blocks, edge blocks, and spacers in accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; Glazing gaskets in accordance with ASTM C 864.

2.04 WINDOW FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

B. Fabrication Tolerance:
1. Material Cuts: Square to 1/32 inch off square, over largest dimension; proportionate amount of 1/32 inch on the two dimensions.
2. Maximum Offset: 1/64 inch in alignment between two consecutive members in line, end to end.
3. Maximum Offset: 1/64 inch between framing members at glazing pocket corners.
4. Joints (Between adjacent members in same assembly): Hairline and square to adjacent member.
5. Variation (In squaring diagonals for doors and fabricated assemblies): 1/16 inch .
6. Flatness (For doors and fabricated assemblies): +/- 1/16 inch off neutral plane.

2.05 WINDOW FINISHES AND COLORS

A. High Performance Organic Coating Finish: (2 coat system)
1. Fluoropolymer Type: Finish all exposed areas of aluminum windows and components with Fluropon® = (70% Kynar) AA-M12-C42-R1X & AAMA 2605-98 & ASCA 96
2. Colors: as selected by the Architect from manufacturers standard color chart.
3. Kynar finishes shall have a 20-year warranty.

B. Finishes Testing:
1. Apply 50% solution NaOH, sodium hydroxide, to small area of finished sample area; leave in place for sixty minutes; lightly wipe off NaOH; Do not clean area further.
2. Submit samples with test area noted on each sample.

2.06 WINDOW HARDWARE

A. For each in-swinging window, furnish manufacturer’s standard-finish cam handles, continuous aluminum hinge, and stainless steel support arms.

B. Provide concealed limit device on all operable units to restrict opening width to 6” maximum.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS / RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.04 INSTALLATION

A. General: Install manufacturer's system in accordance with shop drawings, and within specified tolerances.

1. Protect aluminum members in contact with masonry, steel, concrete, or dissimilar materials using neoprene gaskets or bituminous coating.
2. Shim and brace aluminum system before anchoring to structure.
3. Verify window system allows water entering system to be collected in gutters and weeped to exterior. Verify weep holes are open, and metal joints are sealed in accordance with
4. Seal metal-to-metal window system joints using sealant recommended by system manufacturer.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

B. Field Test: At Owner’s request, conduct field test to determine water tightness of window system. Conduct test in accordance with NAAMM FC-1-76 at locations selected by Architect.
   1. If requested and window passes test, contractor shall be compensated for this testing.
   2. If requested and window fails test, contractor shall correct deficiencies in all units, and pay for re-testing until window passes test.

3.06 ADJUSTING AND CLEANING

A. Adjusting: Adjust operating items as recommended by manufacturer.

B. Cleaning: The General Contractor shall clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance, and remove construction debris from project site. Legally dispose of debris.

C. Protection: The General Contractor shall protect installed product's finish surfaces from damage during construction.

END OF SECTION

SECTION 08 71 01
DOOR HARDWARE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Work under this section comprises of furnishing and installing commercial door hardware needed for a complete and operational system for following:
      a. Swinging doors

PART 2PRODUCTS

2.01 MATERIALS

A. General Requirements:
   1. Hardware shall be of best grade, entirely free of imperfections in manufacture and finish, and shall satisfactorily perform various functions needed.
   2. Furnish necessary screws, bolts or others fastenings of suitable size and type to anchor hardware in position and match hardware as to material and finish. Provide Phillips flat-head screws except as otherwise indicated.
   3. Do not use through-bolts for installations where bolt head or nut opposite face is exposed in other work. Use of sex bolts shall not be allowed.
   4. Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as indicated. Items of hardware not definitely specified, but needed for satisfactory installation of hardware shall be provided. Such items shall be of type and quality suitable for service needed and comparable to adjacent hardware.
   5. Finishes shall comply with ANSI A156.18/ BHMA 1301. Finish designations cross references shall be as follows:

BHMA Code	Description	Nearest US Equiv.	BHMA Category	Basis Metal
600	Primed for painting	USP	D	Steel
626	Satin chromium plated	US26D	A	Brass; Bronze
628	Satin aluminum, clear anodized	US27	A	Aluminum
630	Satin stainless steel	US32D	A	Stainless Steel
652	Satin chromium plated	US26D	E	Steel
689	Aluminum painted	US28	E	Any

B. SUBSTITUTIONS:

   1. Manufacturers and model numbers listed are to establish a standard of quality and design. The architect must approve all product substitutions. Any request for substitutions must be submitted 10 days before the bid date, to allow sufficient time for an addendum to be added to the bid document. In accordance with Section 016000, required data and physical samples must be provided to the architect for review.

2.02 HINGES

A. Butt Hinges: ANSI/ BHMA A156.1
   1. Provide full mortise, template, 5-knuckle, button tip hinges with non-rising loose pins and ball type bearings.
   2. Out-swinging exterior doors shall be furnished with solid bronze or stainless steel, hinges with non-removable pins or security studs.
   3. Interior doors with locksets shall be furnished with non-removable pins hinges.

4. Hinges shall be furnished in following quantities:
   a. Doors up to 90” in height: 3 hinges
   b. Doors over 90” in height: Add 1 hinge for every additional 30”
5. Furnish hinge sizes not less than as follows:
   a. For 1 3/4” Thick Doors: Standard weight
      1) Doors up to 3'-0” wide: 4 1/2 x 4 1/2 x 0.134 gauge
      2) Doors 3'-0” to 4'-0” wide: 5 x 4 1/2 x 0.146 gauge
      3) Doors over 4'-0” wide: 6 x 4 1/2 x 0.160 gauge
   b. For 1 3/4” Thick Doors: Heavy weight
      1) Doors up to 3'-0” wide: 4 1/2 x 4 1/2 x 0.180 gauge
      2) Doors 3'-0” to 4'-0” wide: 5 x 4 1/2 x 0.190 gauge
      3) Doors over 4'-0” wide: 6 x 4 1/2 x 0.203 gauge
6. Furnish hinges of sufficient throw where needed to clear trim or permit doors to swing 180 degrees.
7. Finishes:
   a. Exterior Doors: BHMA #630 (US32D)
   b. Interior Doors: BHMA #652 (US26D)
8. Acceptable Manufacturers:
   a. Bommer
   b. Hager
   c. Mckinney

2.03 LOCKSETS AND LATCHSETS

A. General Requirements:
   1. Shape of lever shall be easy to grasp with one hand and not require tight grasping, tight pinching, or twisting of wrist.
   2. Locksets and latchsets shall not require more than 15 lbf to release latch. Locks shall not require use of a key, tool, or special knowledge for operation.
   3. Provide manufacturer's standard wrought box strike for each latchset and lockset with curved lip extended to protect frame without catching clothing. Finish shall match hardware set.
   4. Locks and cylinders shall be provided with small format figure eight housing to accept Best interchangeable cores. Lock cylinder parts shall be made from brass/bronze, stainless steel, or nickel silver.

B. Mortise Locksets and Latchsets:
   1. Provide heavy duty mortise locksets and latchsets that comply to ANSI A156.13, Series 1000, Grade 1 Operational. Functions as listed in Hardware Sets.
   2. Locksets shall be manufactured from heavy gauge steel, 1/8” minimum lockcase thickness, containing components of steel with a zinc dichromate plating for corrosion resistance.
   3. Locksets are to have a standard 2 3/4” backset with a full 3/4” throw. Deadbolt shall be a full 1” throw, constructed of stainless steel.
   4. Lock shall be easily handed without opening the lock case.
   5. Lock trim shall be through-bolted to door to assure correct alignment a proper operation.
   6. Finish: BHMA #626 (US26D)
   7. Acceptable Manufacturers:
      a. Best Lock: 45H Series with 15H lever design
      b. Schlage: L Series with 06A lever design
      c. Other substitutions not allowed

2.04 DOOR CLOSERS

A. General Requirements:
   1. Closers shall be sealed and filled with all-weather fluid. Provide stable hydraulic fluid to withstand a temperature range of 120 degrees F to minus 30 degrees F.

B. Surface Closers: ANSI/ BHMA A156.4, Grade 1
   1. Surface mounted closers shall be full rack-and-pinion type with cast iron body. Double heat-treated shaft, full complement bearings, single piece forged piston, chrome silicon steel spring, non-critical screw valves; back check, sweep and latch.
   2. Closer spindle journal size to be a minimum ¾” diameter
   3. Bearing size to be minimum 5/8” wide
   4. Furnish closers complete with rectangular, non-ferrous covers, necessary brackets and fasteners for top of door surface mounted units.
   5. Closer products with any type of pressure relief valve system shall not be acceptable.
   6. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacturer code.
   7. Non-sized closer to be independent lab tested for 10,000,000 cycles.
   8. Closers shall be non-sized, field adjustable from size 1 to 6.
   9. Furnish non-sized closers with 1 1/2” diameter piston.
   10. Do not through-bolt if there has been special blocking specified in wood door specification; refer to Section 08210.
   11. Locate closers on interior side of exterior doors and on non-public side of interior doors, unless otherwise specified.
   12. Provide extra-duty arms (EDA) at doors scheduled with parallel arm applications.
   13. Provide plates, brackets and special templates when needed for interface with particular header door and wall conditions and adjacent hardware.
   14. Closers shall be tested to 100 hours of salt spray test in compliance with ASTM B117; furnish data on request.
   15. Finish: BMHA #628 Powder-coated aluminum finish
   16. Acceptable Manufacturers:
      a. LCN: 4040XP Series (where specified in hardware sets)
      b. Substitutions not allowed

2.05 OVERHEAD STOPS AND HOLDERS

A. Surface Mounted Heavy Duty Overhead Holders/Stops: ANSI/ BHMA A156.8
   1. Description: Heavy-duty extruded brass, bronze or stainless steel stop/holders with shock absorber and no plastic parts
   2. Finish: BHMA #630 (US32D)
   3. Acceptable Manufacturers:
      a. GJ: 90 Series
      b. No Substitution permitted

2.06 SEALS AND GASKETS

A. General Requirements: ANSI/ BHMA A156.21
   1. Except as otherwise indicated provide weather-stripping and sweeps of type, size and profile as shown or scheduled.
   2. Metal: Extruded aluminum; 6063-T5 alloy
      a. Finish: Aluminum anodized; BHMA #628 (US28)
   3. Acceptable Manufacturers:
      a. National Guard
      b. Pemko

c. Reese

2.07 THRESHOLDS

A. General Requirements: ANSI/ BHMA A156.21
1. Except as otherwise indicated provide standard threshold units of type, size and profile as shown or scheduled.
2. Metal: Extruded aluminum; 6063-T5 alloy
a. Finish: Clear anodized; BHMA #628 (US28)
3. Provide thresholds with vinyl foot seals.
4. Acceptable Manufacturers:
a. National Guard
b. Pemko
c. Reese

2.08 CYLINDERS, KEYING SYSTEMS AND KEY CONTROL

A. General Requirements:

B. Provide temporary construction keying system during construction period. Permanent keys shall be furnished to Owner's Representative prior to occupancy. Owner or Owner's Security Agent will void operation of construction keys.

C. Permanent keyed lock cores:
1. Permanent lock cores to match existing manufacturer and keyway.

D. Key Material:
1. Provide manufacturer's standard embossed keys of nickel silver to ensure durability. Key Quantity: Furnish keys in following quantities:
a. Master Keys: 6 per master group
b. Key Blanks: 3 per cylinder
c. Temporary Construction Master Keys: 12 total
2. Deliver end user exclusive permanent key blanks and other security keys directly to Owner's representative from manufacturer by secure courier, return receipt requested. Failure to properly comply with these requirements shall be cause for replacement of cylinders and keys involved at no additional cost to Owner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions:
1. Examine doors and frames with Installer present for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
2. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
3. Proceed with installation only after unsatisfactory conditions have been corrected.
4. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Surface Preparation:
1. Steel Doors and Frames: Comply with DHI A115 Series
a. Surface-Applied Door Hardware: Drill and tap doors and frames in compliance with SDI 109

3.03 INSTALLATION

A. General Requirements:
   1. Install each door hardware item to comply with manufacturers' written instructions using manufacturer's supplied fasteners.
   2. Securely install finish hardware items in compliance with accepted schedule and templates furnished with hardware.
   3. Install mortised items flush with adjacent surfaces.
   4. Install locksets, surface mounted closers, and trim after finishing of doors and frames is complete.
      a. Where cutting and fitting is needed to install door hardware onto or into surfaces that are to be painted or finished in another way later, coordinate removal, storage, and reinstallation of door hardware with finishing work.
   5. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
   6. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in compliance with industry standards.

B. Mounting Heights:
   1. Mount door hardware units at heights indicated in following applicable publications, unless otherwise specifically indicated or required to comply with governing regulations:
      a. Steel Doors and Frames: ANSI A250.6
         1) DHI Publication Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
         2) DHI Publication Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames

C. Door Closers:
   1. Mount all door closers parallel arm as per university standard unless otherwise noted in hardware sets. All door closers are to be thru-bolted.

D. Thresholds:
   1. Set thresholds for exterior and acoustical doors in full bed of sealant in compliance with requirements specified in Division 7.

3.04 ADJUSTING

A. Initial Adjustment:
   1. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   2. Adjust door closer sweep period so that from an open position of 70 degrees door will take at least 3 seconds to move to a point 3” from latch measured to leading edge of door.

B. Final Adjustment:
   1. Return to Project during week prior to Substantial Completion and make final check and adjustment of hardware items.
   2. Adjust hardware so doors operate in perfect order. Test and adjust hardware for quiet, smooth operation, free of sticking, binding, or rattling. Adjust closers for proper, smooth operation.
   3. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Six Month Adjustment:

1. Approximately six months after Date of Substantial Completion, installer shall perform following:
   a. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
   b. Consult with, and instruct, Owner's personnel on recommended maintenance procedures.
   c. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation.

3.05 CLEANING

A. Exposed hardware shall be carefully cleaned by methods not injurious to finish, immediately preceding occupancy. Replace defective, damaged, or missing hardware.

B. Clean adjacent surfaces soiled by hardware installation.

C. Clean operating items as needed to restore proper function and finish.

3.06 PROTECTION

A. Provide final protection and maintain conditions that ensure door hardware shall be without damage or deterioration at time of Substantial Completion.

B. Protect door hardware items from abuse, corrosion and other damage until Owner accepts Project as complete.

3.07 DOOR HARDWARE SCHEDULE

A. General Requirements:
   1. To define requirements for materials, size, and design specific products manufactured by certain manufacturers are indicated in door hardware sets. Materials specified herein are cited as minimum standard of quality that will be acceptable and shall not preclude consideration of equivalent or superior materials. Equivalent products by other acceptable manufacturers specified above may be provided.
      a. Door hardware sets provide quantity, item, size, finish or color indicated and named manufacturer's product.
      b. Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Hardware Sets: List of manufacturers represented in the hardware sets:
   1. Hinges:Hager - www.hager.com (HAG)
   2. Locksets & Latchsets:Schlage - www.schlage.com (SCH)
   3. Surface Closers:LCN - www.lcnclosers.com (LCN)
   4. Overhead Stops:Glyn-Johnson - www.glynn-johnson.com (GJH)
   5. Thresholds:National Guard - www.ngp.com (NGP)
   6. Weatherstrip & Gasket:National Guard - www.ngp.com (NGP)

C. HW SET 001

DOOR NO. 100 (PAIR - HMD X HMF)

3	EA	HINGE	BB1199 4.5 X 4.5 NRP	630	HAG
1	EA	STOREROOM LOCK	LV9480BDC 06A	630	SCH
1	EA	PERMANENT CORE	(MATCH EXISTING & KEYWAY)	626	
1	EA	SURFACR CLOSER	4040XP-3049EDA	689	LCN
1	EA	OVERHEAD STOP	90S	630	GLY

1	SET	PERIMETER SEAL	9002A	628	NGP
1	EA	DRIP GUARD	16A	628	NGP

END OF SECTION

SECTION 08 80 00
GLASS AND GLAZING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Glass and glazing for windows.

1.02 SOURCE QUALITY CONTROL

A. Sealed insulating glass units: Conform to Sealed Insulating Glass Manufacturers' Association Specification (SIGMA) No. 70-7-1 and tested in accordance with ASTM E-774 and 773.

1.03 REFERENCE STANDARDS

A. Conform to applicable provisions of the following standards:
   1. FS DD-G-451C - Glass, Plate, Sheet, Figured Flat for Glazing, Mirrors and Other Uses.
   2. ASTM C-1036 - Standard Specifications for Flat Glass.
   3. ASTM C-1048 - Standard Specifications for Heat Treated Flat Glass.
   4. FS TT-G-410E - Glazing Compound, Sash Metal for Back Bedding and Face Glazing Not for Channel or Stop Glazing.
   5. FS TT-S-230A - Sealing Compound, Synthetic Rubber Base, Single Component, Chemical Curing for Caulking, Sealing and Glazing in Building Construction.
   6. FS TT-S-001543 - Sealing Compound, Silicone Base (for Caulking and Glazing in Buildings and Other Structures).
   7. NAAMM #SS-1B-68 - Nonskinning Resilient Preformed Compounds - Tapes, Ribbons, beads with Release paper.
   8. SIGMA #70-7-1 - Sealed Insulating Glass Units.

1.04 GUARANTEE/WARRANTY

A. All work and materials are subject to the general warranty as described in the Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS. In addition, the following guarantee applies:
   1. Guarantee: Provide for replacing, at no cost to Owner, hermetically sealed glass units which exhibit interpane dusting or misting within minimum period of five (5) years from date of Substantial Completion of Work.

1.05 CODE COMPLIANCE

A. Materials and installation shall conform to Chapter 86 of Part VII, Title 16 of the Delaware Code and 16 CFR Part 1201 - Safety Standards for Architectural Glazing Materials.

B. Permanent labeling of safety glass in accordance with above code is required.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. As listed for each product.

B. Substitutions: Items of same function and performance are acceptable in conformance with Section 01 60 00.

2.02 GLASS TYPES

A. Type 1: Insulating glass units consisting of two sheets of 1/4" float glass complying with FS-DD-G-451D, Type 1, Class I, Quality q3, separated by a 1/2 inch air space. Units shall be fabricated with a spacer strip and exposed sealant at edges. Outboard light- To be selected from Manufacturer’s tint; inboard light - clear; Hard low-E coating on surface no.3.

B. Acceptable Manufacturers:
   1. Independent Insulating Glass Co.

2. Solar Seal
3. ASG Industries
4. Guardian
5. PPG Industries
6. Libbey- Owens-Ford

2.03 GLAZING MATERIALS

A. Glazing Compound /Sealant : Per manufacturer recommendations, standard color selected by architect, Shore 'A' Hardness of 15-25.
   1. Modified oil type; FS TT-G-410E.
   2. Single component polysulfide; FS TT-S-230;
   3. Single component acrylic; FS TT-S-230.

B. Follow manufacturer's recommendations for all materials including:
   1. Glazing Tape:Preformed butyl type; NAAMM #SS-1B-68, with integral spacing device; 10-15 durometer hardness; paper release.
   2. Setting Blocks: Neoprene; 10-90 durometer hardness
   3. Spacer Shims: Neoprene; 50 durometer hardness
   4. Glazing Splines: Polyvinyl chloride or manufacturer's standard dry glazing splines to suit aluminum extrusions. Color to match aluminum work

PART 3 - EXECUTION

3.01 GENERAL

A. Manufacturer's Instructions: Follow in executing all glazing work.

B. Sizing: Obtain final sizes for all glass by job measurement.

C. Preparation: Check all openings prior to glazing to ascertain that opening is square, plumb and secure. Clean all surfaces that will receive glazing materials with cleaner as recommended by manufacturer; wipe dry.

D. Windows: Install spacers, shims and setting blocks as recommended by glass manufacturer. Install sealants, glazing tape, vision strips, etc., as recommended by glass manufacturer.

3.02 CLEANING

A. Clean all glass at completion of work of this contract, using materials recommended by the manufacturer.

B. Remove excess glazing material that may have gotten on adjacent material.

END OF SECTION

SECTION 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
   1. Resilient tile and sheet.

B. Preparation of existing concrete floor slabs for installation of floor coverings.

C. Testing of concrete floor slabs for moisture and pH.

D. Remediation of concrete floor slabs due to unsatisfactory moisture or pH conditions.
   1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

PART 2 PRODUCTS

2.01 MATERIALS

A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
   1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
   2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
   3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, and suitable for adhesion of flooring without further treatment.
   1. Thickness: 1/8 inch, maximum.
   2. If testing agency recommends any particular products, use one of those.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Preliminary cleaning.
   2. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
   3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   4. pH tests; in same locations as moisture vapor emission tests, unless otherwise indicated.

5. Specified remediation, if required.
6. Patching, smoothing, and leveling, as required.
7. Other preparation specified.
8. Adhesive bond and compatibility test.
9. Protection.

B. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
3. Excessive pH: If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

B. Do not use solvents or other chemicals for cleaning.

3.03 MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F1869 and as follows.

D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.

F. Report: Report the information required by the test method.

3.04 INTERNAL RELATIVE HUMIDITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F2170 Procedure A and as follows.

D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

F. Report: Report the information required by the test method.

3.05 PH TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Note: This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.

C. Use a wide range pH paper, its associated chart, and distilled or deionized water.

D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the pH paper into the water, remove it, and compare immediately to chart to determine pH reading.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value is over 10.

3.06 PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with requirements and recommendations of floor covering manufacturer.

C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.

D. Do not fill expansion joints, isolation joints, or other moving joints.

3.07 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.08 APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

3.09 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Cold formed metal soffit framing.

D. Gypsum wallboard.

E. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Sealant.

B. Section 09 30 00 - Tiling: Tile backing board.

1.03 REFERENCE STANDARDS

A. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2012.1.

B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2012.1.

C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).

D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2011a.

E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.

F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2011.

G. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.

H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.

I. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2010a.

J. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets; 2008b.

K. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2011.

L. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.

M. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

N. ASTM E413 - Classification for Rating Sound Insulation; 2010.

O. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2010.

P. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

D. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory. Refer to Drawings for UL Assembly Reference Numbers.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Marino: www.marinoware.com.
   3. Phillips Manufacturing Company: www.phillipsmfg.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/360 at 7.5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
   2. Studs: "C" shaped with flat or formed webs 20 gage minimum.
   3. Runners: U shaped, sized to match studs.

4. Ceiling Channels: C shaped.
5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and braced with continuous bridging both sides.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
1. CertainTeed Corporation: www.certainteed.com.
2. Georgia-Pacific Gypsum: www.gpgypsum.com.
3. Lafarge North America Inc: www.lafargenorthamerica.com.
4. National Gypsum Company: www.nationalgypsum.com.
5. USG Corporation: www.usg.com.
6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
a. Mold-resistant board is required at all locations.
3. Thickness:
a. Vertical Surfaces: 5/8 inch.
b. Ceilings: 5/8 inch.

C. Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind tile in wet areas including tub and shower surrounds.
2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
a. Thickness: 1/2 inch.
b. Products:
1) Custom Building Products; Wonderboard.
2) National Gypsum Company; PermaBase Brand Cement Board.
3) USG Corporation; Durock Brand Cement Board.
4) Substitutions: See Section 01 60 00 - Product Requirements.

2.04 ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, or rigid plastic, unless otherwise indicated.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional cornerbead and control joints, provide L-bead at exposed panel edges.

B. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch wide, coated glass fiber tape for joints and cornersin wet areas.
2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Ready-mixed vinyl-based joint compound.
4. Powder-type vinyl-based joint compound.

C. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

D. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.

E. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.
   3. Install bracing as required at exterior locations to resist wind uplift.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.04 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials .

3.06 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
   4. Level 0: Temporary partitions and surfaces indicated to be finished in later stage of project.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Cementitious backer board as tile substrate.

D. Solid surface thresholds.

E. Ceramic trim.

1.02 REFERENCE STANDARDS

A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2012.1.

B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2012.1.

C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 2012.1.

D. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement

E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2012.1.

F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2012.1.

G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 2012.1.

H. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 2012.1.

I. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 2012.1.

J. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2012.1.

K. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2012.1.

L. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar; 2012.1.

M. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2012.1.

N. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installation; 2012.1.

O. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2012.

P. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2012.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.04 QUALITY ASSURANCE

A. Maintain one copy of The Tile Council of North America Handbook and ANSI A108 Series/A118 Series on site.

B. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: All products by the same manufacturer.
   1. American Olean: www.americanolean.com.
   2. Dal-Tile Corporation: www.daltile.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Porcelain Mosaic Tile :
   1. Moisture Absorption: 0 to 0.5 percent.
   2. Size and Shape: 2 inch square.
   3. Edges: Square.
   4. Surface Finish: Unglazed.
   5. Colors: As scheduled.
   6. Trim Units: Matching cove shapes in sizes coordinated with field tile.

C. Glazed Wall Tile : ANSI A137.1, and as follows:
   1. Size and Shape: 4-1/4 inch square.
   2. Edges: Cushioned.
   3. Surface Finish: High gloss.
   4. Colors: Price Group 3.
   5. Trim Units: Matching bullnose shapes in sizes coordinated with field tile.

D. Paver and Wall Tile : ANSI A137.1, and as follows:
   1. Continental Slate manufactured by Daltile or approved equivalent product.
   2. Size and Shape: 18 x 18 inch, 12 x 12 inch and 6 x 6 inch for floor and wall installation.
   3. Thickness: 5/16 inch
   4. Surface Finish: Unglazed.
   5. Wall Pattern: Hopscotch, as shown in Daltile Tile Pattern Guide Brochure.
   6. Floor Pattern: As shown.
   7. Colors: As scheduled.
   8. Trim Units: Matching bullnose and cove base shapes in sizes coordinated with field tile.

2.02 TRIM AND ACCESSORIES

A. Trim: Porcelian, style and dimensions to match field tile, for setting using tile mortar or adhesive.
   1. Applications: Use in the following locations:
      a. Open edges of wall tile: Bullnose
      b. Wall corners, inside: Jointed.
      c. Floor to wall joints: Cove base.
   2. Manufacturer: Same as field tile.

B. Thresholds: Solid surface material, color as scheduled, honed finish; 4 inches wide by full width of wall or frame opening; 3/4 inch thick; profile as detailed with radiused corners on top side; without holes, cracks, or open seams
   1. Applications: Provide at the following locations:
      a. At doorways where tile terminates.
      b. At open edges of floor tile where adjacent finish is a different height.

2.03 SETTING MATERIALS

A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
   1. Application(s): Use this type of bond coat where indicated and where no other type of bond coat is indicated.
   2. Products:
      a. Custom Building Products; MegaLite: www.custombuildingproducts.com.
      b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com.
      c. Merkrete, by Parex USA, Inc; Merkrete 720 Marble Pro: www.merkrete.com.
      d. ProSpec, an Oldcastle brand; Permalastic System: www.prospec.com.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 MORTAR MATERIALS

A. Mortar Bond Coat Materials for Thin-Set Installations:
   1. Latex-Portland Cement type: ANSI A118.4.

2.05 GROUTS

A. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
   1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
   2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
   3. Color(s): As selected by Architect from manufacturer's full line.

B. Grout Sealant: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
   1. Products:
      a. Bonsal, W. R., Company; Grout Sealer.
      b. Bostik; CeramaSeal Grout Sealer.
      c. C-Cure; Penetrating Sealer 978.
      d. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
      e. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
      f. TEC Specialty Products Inc.; TA-256 Penetrating Silicone Grout Sealer.”

2.06 THIN-SET ACCESSORY MATERIALS

A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
   1. Crack Resistance: No failure at 1/16 inch gap, minimum.

2. Providing compliance with performance requirements and manufacturer's installation requirements, the following trowel applied crack prevention membrane is approved:
   a. RedGard Waterproofing and Crack Prevention Membrane manufactured by Custom Building Products.

B. Cementitious Backer Board: ANSI A118.9; High density, cementitious, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
   1. Refer to Section 09 21 16.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install non-ceramic trim in accordance with manufacturer's instructions.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

J. Grout tile joints.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with The Tile Council of North America Handbook Method F125-Full, with Latex/Polymer Modified Portland Cement Mortar and Polymer Modified Tile grout, unless otherwise indicated.
   1. Use uncoupling membrane under all tile unless other underlayment is indicated.
   2. Where waterproofing membrane is indicated, install in accordance with The Tile Council of North America Handbook Method F122 for slab on grade, F122A for elevated slabs, with Latex/Polymer Modified Portland Cement Mortar and Polymer Modified Tile.
      a. Locations: Showers, tiled custodial closets and toilet rooms with floor drains

3.05 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with The Tile Council of North America Handbook Method W244.

B. Over interior concrete and masonry install in accordance with The Tile Council of North America Handbook Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.06 GROUTING

A. Follow grout manufacturer's recommendations as to grouting procedures and precautions.

B. Remove all grout haze, observing both tile and grout manufacturer's recommendations as to use of acid and chemical cleaners.

C. Rinse tile work thoroughly with clean water before and after chemical cleaners.

D. Polish surface of tile work with soft cloth.

3.07 PROTECTION, CLEANING AND GROUT SEALING

A. Do not permit traffic over finished floor surface for 4 days after installation.

B. Apply to clean, completed tile walls and floors a protective coat of neutral cleaner solution, 1 part cleaner to 1 part water.

C. Cover tile floors with heavy-duty, non-staining construction paper, masked in place.

D. Prior to final acceptance of tile work, remove paper and rinse protective coat of neutral cleaner from all the surfaces.

E. Clean tile and grout surfaces.

F. Apply grout sealant according to manufacturer's directions.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Suspended metal grid ceiling system.

C. Acoustical units.

1.02 REFERENCE STANDARDS

A. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2007.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2011.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2008e1.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two samples 6 x 6 inch in size illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 6 inches long, of suspension system main runner, cross runner, and perimeter molding.

1.05 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Panels Type ACP-1: Painted mineral fiber, ASTM E1264, Type IV with the following characteristics:
   1. Size: 24 x 48 inches.
   2. Thickness: 3/4 inches.
   3. Composition: Wet felted.
   4. NRC Range: 0.70 as specified in ASTM E1264.

5. Ceiling Attenuation Class (CAC): 35, determined as specified in ASTM E1264.
6. Edge: Square.
7. Surface Color: White.
8. Product: Fine Fissure, Square Lay-in, HumiGuard Plus by Armstrong.
9. Suspension System: Exposed grid Type 1.

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Construction: Double web.
   3. Finish: White painted.
   4. Product: Prelude XL by Armstrong.

D. Exposed Steel Suspension System Type 2: Formed G90 hot-dipped galvanized steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Construction: Double web.
   3. Finish: White painted.
   4. Product: Prelude Plus XL by Armstrong.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Acoustical Sealant For Perimeter Moldings: Specified in Section 07 90 05.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

H. Do not eccentrically load system or induce rotation of runners.

I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

3.02 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.03 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Resilient tile flooring.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 05 61 - Common Work Results for Flooring Preparation: Independent agency testing of concrete slabs, cleaning, and preparation.

1.03 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

B. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2012.

C. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.

D. RFCI - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; 1998.

E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Verification Samples: Submit two samples, 12 x 12 inch in size illustrating color and pattern for each resilient flooring product specified.

E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.

1.05 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Rubber Tile: Homogeneous color and pattern throughout thickness, and:
   1. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
   2. Design: Sculptured.

3. Size: 18-1/8 x 18-1/8 inch.
4. Overall Thickness: 0.125 inch.
5. Pattern: Solid color.
6. Manufacturers:
   a. Mannington; Product ColorSpec.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
   1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

C. Moldings, Transition and Edge Strips: manufactured by Johnsonite, Inc.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is cured.

E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

C. Install tile to monolithic pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean and wax in accordance with manufacturer's instructions.

3.06 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. efer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Surface preparation.

C. Field application of paints.

D. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Elevator pit ladders.
   2. Exposed surfaces of steel lintels and ledge angles.
   3. Mechanical and Electrical:
      a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      c. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

E. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   7. Marble, granite, slate, and other natural stones.
   8. Floors, unless specifically so indicated.
   9. Ceramic and other tiles.
   10. Solid surface material wall panels
   11. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
   12. Exterior insulation and finish system (EIFS).
   13. Glass.
   14. Concrete masonry in utility, mechanical, and electrical spaces.
   15. Acoustical materials, unless specifically so indicated.
   16. Concealed pipes, ducts, and conduits.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").

2. MPI product number (e.g. MPI #47).
3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.

D. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Label each container with color in addition to the manufacturer's label.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.04 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
1. Substitution of a paint different system using MPI-approved products by the same manufacturer will be considered.

B. Paints:
1. Glidden Professional: www.gliddenprofessional.com.
2. Benjamin Moore & Co: www.benjaminmoore.com.
3. Sherwin-Williams Company: www.sherwin-williams.com.

C. Primer Sealers: Same manufacturer as top coats.

D. Block Fillers: Same manufacturer as top coats.

E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Supply each coating material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings
1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint ME-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
2. Semi-gloss: Two coats of latex enamel; ____.

B. Paint MgE-OP-3L - Galvanized Metals, Latex, 3 Coat:
1. One coat galvanize primer.
2. Semi-gloss: Two coats of latex enamel; ____.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
1. Medium duty applications include doors and door frames.
2. Two top coats and one coat primer.
3. Top Coat(s): MPI High Performance Architectural Interior Latex; MPI #139,140, 141.
4. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
5. Primer(s): As recommended by manufacturer of top coats.

B. Paint I-OP-MD-WC - Medium Duty Vertical/Overhead: Including gypsum board and plaster.
1. Applications: See Finish Schedule.
2. Two top coats and one coat primer.
3. Top Coat(s): MPI High Performance Architectural Interior Latex; MPI #138-141.
4. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
5. Top Coat Product(s):
   a. Sherwin-Williams Harmony Low Odor Interior Latex.
6. Primer(s): As follows unless other primer is required or recommended by manufacturer of top coats:
   a. Gypsum Board: MPI #50, Interior Latex Primer Sealer.
   b. Plaster: MPI #50, Interior Latex Primer Sealer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

G. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

I. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Sand metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

SECTION 10 21 13.19
SOLID COMPOSITE TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Solid composite toilet compartments.

C. Urinal screens.

1.02 RELATED REQUIREMENTS

A. Section 10 28 00 - Toilet Accessories.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit two samples of partition panels, 6 x 6 inch in size illustrating panel finish, color, and sheen.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Toilet Compartments:
   1. Basis of Design: Bobrick; Product 1090 Sierra series.
   2. Substitutions: Section 01 60 00 - Product Requirements.

2.02 COMPONENTS

A. Toilet Compartments: Solid molded composite panels, doors, and pilasters, floor-mounted headrail-braced.

B. Door and Panel Dimensions:
   1. Door and Stile Thickness: 3/4 inch.
   2. Door Width: 24 inch.
   3. Door Width for Handicapped Use: 36 inch, out-swinging.
   4. Panel Thickness: 1/2 inch.
   5. Height: 58 inch.
   6. Thickness of Pilasters: 1 inch.

C. Urinal Screens: Wall mounted with two panel brackets, and floor vertical upright consisting of pilaster anchored to floor.

2.03 ACCESSORIES

A. Pilaster Shoes: Formed ASTM A666, Type 304 stainless steel with satin finish, 3 in high, concealing floor fastenings.

B. Head Rails: Hollow anodized aluminum tube, 1 x 1-5/8 inch size, with anti-grip strips and cast socket wall brackets.

C. Pilaster Brackets: Polished stainless steel.

D. Wall Brackets: Continuous type, polished stainless steel.

E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

F. Hardware: Polished stainless steel:
   1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
   2. Door Latch: Slide type with exterior emergency access feature.
   3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
   4. Coat hook with rubber bumper; one per compartment, mounted on door.
   5. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00
TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 10 00, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Accessories for toilet rooms.

C. Grab bars.

1.02 RELATED REQUIREMENTS

A. Section 10 21 13.19 - Solid Composite Toilet Compartments.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.

B. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2010.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

E. ASTM C1036 - Standard Specification for Flat Glass; 2011e1.

F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products listed are made by Bobrick and Bradley Corporation.

B. Other Acceptable Manufacturers:
   1. A & J Washroom Accessories Inc: www.ajwashroom.com.
   2. American Specialties, Inc: www.americanspecialties.com.
   3. Substitutions: Section 01 60 00 - Product Requirements.

C. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Stainless Steel Sheet: ASTM A666, Type 304.

C. Stainless Steel Tubing: ASTM A269, Type 304 or 316.

D. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

E. Mirror Glass: Float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

F. Adhesive: Two component epoxy type, waterproof.

G. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

B. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

C. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

2.04 TOILET ROOM ACCESSORIES

A. Toilet Paper Dispenser: Jumbo Roll Dispenser
   1. Product: San-Jamar Model No. R4000TBK.

B. Not Used

C. Paper Towel Dispenser: Folded paper type, Black Pearl ABS cover, surface-mounted, .
   1. Product: T1490TBK manufactured by San-Jamar.

D. Electric Hand Dryer:
   1. Manufacturers:
      a. Excel Dryer; Product Xlerator: www.exceldryer.com.
   2. Substitutions: Section 01 60 00 - Product Requirements.

E. Waste Receptacle:
   1. Product: Floor Type, Model # 3546 manufactured by Rubbermaid.

F. Soap Dispenser: Soap dispenser, wall-mounted, surface, with black ABS cover .
   1. Product: #S890TBK manufactured by San-Jamar.

G. Mirrors: Stainless steel framed, 6 mm thick laminated glass mirror.
   1. Series B- 290 manufactured by Bobrick.
   2. Size: 18 x 30 inches.
   3. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
   4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.

H. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
   1. Length and configuration: As indicated on drawings.
   2. Product: B-6806 Series manufactured by Bobrick.

I. Not Used

J. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
   1. Product: B-254 manufactured by Bobrick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

END OF SECTION

SECTION 14 20 10
PASSENGER ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Complete renovation of existing elevator and related machinery.

C. Elevator maintenance.

1.02 RELATED REQUIREMENTS

A. Section 09 65 00 - Resilient Flooring: Floor finish in cab.

1.03 REFERENCE STANDARDS

A. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; The American Society of Mechanical Engineers; 2012.

B. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.

C. NFPA 70 - National Electrical Code; National fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a meeting one month prior to starting work.
   1. Review schedule of installation, installation procedures and conditions, and coordination with related work.

B. Construction Use of Elevator: Not permitted.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate the following information:
   1. Locations of machine room equipment: driving machines, controllers, governors and other component.
   2. Clearances and over-travel of car and counterweight.
   3. Location and sizes of access doors, doors, and frames.
   4. Interface with building security system.
   5. Electrical characteristics and connection requirements.
   6. Show arrangement of equipment in machine room. Arrange equipment for clear passage through access door.

C. Product Data: Provide data on the following items:
   1. Signal and operating fixtures, operating panels, indicators.
   2. Cab design, dimensions, layout, and components.
   3. Cab and hoistway door and frame details.
   4. Electrical characteristics and connection requirements.

D. Samples: Submit two samples, 12 x 12 inch in size illustrating cab interior finishes.

E. Maintenance Data: Include:
   1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.

2. Technical information for servicing operating equipment.
3. Legible schematic of wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with applicable code and as supplemented in this section.

B. Perform welding of steel in accordance with AWS D1.1.

C. Fabricate and install door and frame assemblies in accordance with NFPA 80.

D. Perform electrical work in accordance with NFPA 70.

E. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for elevator operating equipment and devices.

PART 2 PRODUCTS

2.01 ELEVATORS

A. Elevator No. 1: Passenger, geared electric. Renovate existing elevator.
1. Manufacturer: Otis
2. Capacity:
   a. Existing: 4000#.
   b. Renovated: Retain existing.
3. Operation and Controls: as follows.
   a. Existing: Single Automatic Pushbutton Relay-based.
   b. Renovated: Selective-Collective Microprocessor-based.
4. Motor Control:
   a. Existing: Two speed AC.
   b. Renovated: AC Variable Voltage, Variable Frequency Microprocessor-based with Digital Closed-loop feedback.
5. Power Characteristics:
   a. Existing: 208 volts, 3 Phase, 60 Hertz, (field verify).
   b. Renovated: Retain existing.
6. Stops/Openings:
   a. Existing: Three/Front
   b. Renovated: Retain existing.
7. Travel Distance:
   a. Existing: 24'-0" +/- (field verify)
   b. Renovated: Retain existing.
8. Minimum Clear Inside Car:
   a. Existing: 5'-5 5/8" wide x 7'-11 3/16" deep (field verify)
   b. Renovated: Retain existing.
9. Entrance Size:
   a. Existing: 4'-0" wide x 7'-0" high (field verify)
   b. Renovated: Retain existing.
10. Entrance Type:
   a. Existing: Two-speed, Side Opening
   b. Renovated: Retain existing, New Door Panels.

11. Door Operator:
    a. Existing: Heavy Duty Door Operator
    b. Renovated: High-speed Heavy Duty Door Operator with closed loop operation.
12. Door Protection:
    a. Existing: Full Screen Device
    b. Renovated: Infrared, Full Screen Device with Differential Timing, Nudging and Interrupted Beam Time.
13. Safety:
    a. Existing: Instantaneous Type A.
    b. Renovated: Retain existing.
14. Guide Rails:
    a. Existing: Planed Steel Tees.
    b. Renovated: Retain existing.
15. Buffers:
    a. Existing: Spring.
    b. Renovated: New Springs.
16. Cab Enclosure:
    a. Existing: To be removed.
    b. Renovated: Stainless Steel Shell with Textured Metal Finishs, Flush Lights in Canopy, Heavy Duty Floor Tile, Stainless Steel Doors.
        1) Vandal resistant steel shell, stainless steel finish with flush fluorescent lighting and 12 gauge canopy.
        2) Car interior finishes provided under this scope of work.
        3) 8'-0" clear height under canopy.
        4) Provide pad buttons, vinyl-conered pad hooks, vinyl-covered pads.
        5) Provide battery-powered emergency car lighting. Provide separate constant-pressure test button in car service compartment.
17. Signal Fixtures:
    a. Existing: To be removed.
    b. Renovated: Provide LED illumination contractor's vandal resistant assembly.
18. Hall and Car Pushbutton Stations:
    a. Existing: To be removed.
    b. Renovated: Provide single hall pushbutton riser, single car operating panel, key switch operation.
        1) Vandal resistant hall and car pushbuttons.
19. Car Position Indicators:
    a. Existing: NA.
    b. Renovated: Provide single digital with car direction arrows.
20. Direction Lanterns:
    a. Existing: NA.
    b. Renovated: Provide in-car, both entrance jambs.
21. Hall Car Position Indicators:
    a. Existing: NA.
    b. Renovated: Provide digital with car direction arrows at all floors integral with hall stations.
22. Communication System:
    a. Existing: NA.
    b. Renovated: Provide self-dailing, vandal-resistant, push-to-call, two-way communication system with recall, tracking and voiceless communication.
23. Additional Features: In addition, provide:

a. Independent service.
b. Car and counterweight roller guides.
c. Car top inspection station.
d. Firefighters' Service, Phase I and II, including alternate floor return.
e. Standby power transfer, if provided.
f. Accessibility Signage.
g. Stationary car return panel arranged for surface-applied car operating panel.
h. Hoistway access switches, top and bottom floors.
i. Hoistway door unlocking device, all floors.
j. Load-weighing device.
k. Machine, power conversion unit and controller sound isolation.
l. Tamper resistant fasterners for all fastening exposed to the public.
m. Firefighters' telephone if required by local authority.
n. No visible company name or logo.
o. Wiring diagrams, operating instructions, parts and ordering information.
p. Non-proprietary control system.
q. One year warranty maintence with 24-hour call back service.

24. Rated Speed: 75 fpm.
25. Traction Machine Location: Overhead.

B. Elevator Cabs: Steel walls with stainless steel finish at areas exposed to view, with applied plastic laminate finished wall panels.
1. Ceiling: Stainless steel ceiling panel with cove lighting.

2.02 CONTROLS

A. Elevator Controls: Provide landing buttons and hall lanterns.

B. Door Controls:
1. Program door control to open doors automatically when car arrives at floor.
2. Render "Door Close" button inoperative when car is standing at dispatching terminal with doors open.
3. If doors are prevented from closing for approximately ten seconds because of an obstruction, automatically disconnect door reopening devices, close doors more slowly until obstruction is cleared. Sound buzzer.

C. Landing Buttons: Stainless steel type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with an illuminated center dot (vandal-resistant type).

D. Car Direction Indicators: Illuminating white.

E. Interconnect elevator control system with building fire alarm systems.

F. Provide "Firefighter's Operation" in accordance with applicable code. Designated Landing: 1.

2.03 EMERGENCY POWER

A. Arrange elevator operation to operate under emergency power when normal power supply fails.

B. Emergency Power Supply: Self-contained battery power.

C. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

2.04 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:
1. 208 volts, three phase, 60 Hz.
2. 200 amperes maximum circuit breaker size.

2.05 HOISTWAY COMPONENTS

A. Sheet metal cants at ledges: 12 guage steel plate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that hoistway, pit, and machine room are ready for work of this section.

C. Verify hoistway shaft and openings are of correct size and within tolerance.

D. Verify location and size of machine foundation and position of machine foundation bolts.

E. Verify that electrical power is available and of the correct characteristics.

3.02 PREPARATION

A. Arrange for temporary electrical power for installation work and testing of elevator components.

B. Clear, plumb and substantially flush hoistway with variations not to exceed one inch at any point.

C. Provide cant plates at ledges at first and second floor levels.

3.03 INSTALLATION

A. Install system components. Connect equipment to building utilities.

B. Provide conduit, boxes, wiring, and accessories.

C. Mount machines on vibration and acoustic isolators, on bed plate and concrete pad. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.

D. Accommodate equipment in space indicated.

E. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.

F. Adjust equipment for smooth and quiet operation.

3.04 ERECTION TOLERANCES

A. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

A. Testing and inspection by regulatory agencies will be performed at their discretion.
   1. Schedule tests with agencies and notify Owner and Architect.
   2. Obtain permits required to perform tests.
   3. Document regulatory agency tests and inspections in accordance with the requirements of Section 01 40 00.
   4. Perform tests required by regulatory agencies.
   5. Furnish test and approval certificates issued by authorities having jurisdiction.

B. Perform testing and inspection in accordance with requirements of Section 01 40 00.
   1. Perform tests as required by ASME A17.2.
   2. Provide two weeks written notice of date and time of tests.
   3. Supply instruments and execute specific tests.

3.06 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.

B. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

3.07 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

3.08 PROTECTION

A. Do not permit construction traffic within cab after cleaning.

B. Protect installed products until project completion.

C. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

3.09 MAINTENANCE

A. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer or original installer.

B. Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.

C. Examine system components monthly. Clean, adjust, and lubricate equipment.

D. Include systematic examination, adjustment, and lubrication of elevator equipment. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

E. Perform work without removing cars during peak traffic periods.

F. Provide emergency call back service during working hours for this maintenance period.

END OF SECTION

SECTION 14 20 11
CONTROL BOOTH ELEVATOR

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Complete elevator systems.

C. Elevator maintenance.

1.02 ALTERNATES

A. Refer to Division 1 Section, Alternates, for description of work under this Section affected by alternates.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a meeting four weeks prior to starting work.
   1. Review schedule of installation, installation procedures and conditions, and coordination with related work.

B. Construction Use of Elevator: Not permitted.

1.05 SUBMITTALS

A. Shop Drawings: Indicate the following information:
   1. Hoistway components: Car, counterweight, sheaves, machine and sheave beams, guide rails, buffers, ropes, and other components.
   2. Individual weight of principal components; load reaction at points of support.
   3. Loads on hoisting beams.
   4. Location and sizes of access doors, doors, and frames.
   5. Electrical characteristics and connection requirements.

B. Product Data: Provide data on the following items:
   1. Signal and operating fixtures, operating panels, indicators.
   2. Cab design, dimensions, layout, and components.
   3. Cab and hoistway door and frame details.
   4. Electrical characteristics and connection requirements.

C. Maintenance Data: Include:
   1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
   2. Technical information for servicing operating equipment.
   3. Legible schematic of wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with applicable code and as supplemented in this section.

B. Designer Qualifications: Design guide rails, brackets, anchors, and machine anchors under direct supervision of a Professional Structural Engineer experienced in design of work of this type and licensed in Maryland.

C. Perform structural steel design, fabrication, and installation in accordance with AISC 360, Specification for Structural Steel Buildings. Perform seismic design in accordance with applicable code.

D. Perform welding of steel in accordance with AWS D1.1.

E. Fabricate and install door and frame assemblies in accordance with NFPA 80.

F. Perform electrical work in accordance with NFPA 70.

G. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

H. Installer Qualifications: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

I. Products Requiring Fire Resistance Rating: Listed and classified by UL.

J. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for elevator operating equipment and devices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. KONE; Product 4500 lb, MRL Service Elevator.

2.02 ELEVATORS

A. Elevator No.1: Passenger, gearless electric.
   1. Operation and Controls: Two-stop automatic.
   2. Hoistway Doors and Frames: Stainless steel.
   3. Rated Net Capacity: 4,500 lbs.
   4. Rated Speed: 150 ft/min.
   5. Number of Stops: 2.
   6. Number of Openings: 2 Front.
   7. Traction Machine Location: In shaft with remote closet.

2.03 CONTROLS

A. Elevator Controls: Provide landing buttons and hall lanterns.

B. Door Controls:
   1. Program door control to open doors automatically when car arrives at floor.

C. Landing Buttons: Stainless steel type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows.

D. Provide "Firefighter's Operation" in accordance with applicable code. Designated Landing: G.

2.04 EMERGENCY POWER

A. Arrange elevator operation to operate under emergency power when normal power supply fails.

B. Emergency Power Supply: Emergency Building Generator.

2.05 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:
   1. 12.5 hp.
   2. 34.2 rated load running amperes.
   3. 208 volts, three phase, 60 Hz.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that hoistway, pit, and machine room are ready for work of this section.

C. Verify hoistway shaft and openings are of correct size and within tolerance.

D. Verify location and size of machine foundation and position of machine foundation bolts.

E. Verify that electrical power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install system components. Connect equipment to building utilities.

B. Provide conduit, boxes, wiring, and accessories.

C. Mount machines on vibration and acoustic isolators, on bed plate and concrete pad. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.

D. Accommodate equipment in space indicated.

E. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.

F. Accurately machine and align guide rails. Form smooth joints with machined splice plates.

G. Coordinate installation of hoistway wall construction.

H. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

I. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.

J. Adjust equipment for smooth and quiet operation.

3.03 ERECTION TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1.

B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.04 FIELD QUALITY CONTROL

A. Testing and inspection by regulatory agencies will be performed at their discretion.
   1. Schedule tests with agencies and notify Owner and Architect.
   2. Obtain permits required to perform tests.
   3. Perform tests required by regulatory agencies.
   4. Furnish test and approval certificates issued by authorities having jurisdiction.

3.05 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.

B. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

3.06 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

3.07 PROTECTION

A. Do not permit construction traffic within cab after cleaning.

B. Protect installed products until project completion.

C. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

3.08 MAINTENANCE

A. See Section 01 7000 - Execution Requirements, for additional requirements relating to maintenance service.

B. Provide a separate maintenance contract for specified maintenance service.

C. Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.

D. Examine system components monthly. Clean, adjust, and lubricate equipment.

E. Include systematic examination, adjustment, and lubrication of elevator equipment. Maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

F. Provide emergency call back service at all hours for this maintenance period.

G. Maintain an adequate stock of parts for replacement or emergency purposes locally, near the place of the Work. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.

END OF SECTION

SECTION 14 42 00
VERTICAL PLATFORM LIFT

PART 1 GENERAL

1.01 SUMMARY

A. The product described in this section is a vertical platform lift designed for indoor applications. The operating system is composed of the tower and the lifting platform.

B. Lifts shall be in accordance with local codes and regulations.

1.02 PREPARATORY WORK BY OTHERS

A. The following preparatory work to receive the lifts specified in this section is part of the work by others:
   1. Permanent 120 VAC, 20 amp single-phase power to operate lift to be provided from a lockable fused/cartridge type disconnect switch.defer to drawings for permanent power specifications and location of disconnects. Temporary power may be provided to expedite installation of lift.

B. QUALITY ASSURANCE

C. Subcontractor Qualifications:
   1. Execute work of this section only by a company that has adequate product liability insurance.
   2. Skilled tradesmen must be employees of the installing contractor approved by the lift manufacturer, with demonstrated ability to perform the work on a timely basis.

D. Manufacturer:
   1. Company with not less than 20 years of experience in the design, fabrication and assembly of platform lifts.

E. SUBMITTALS

F. Shop drawings - the shop drawings shall show a complete layout of lifting equipment detailing dimensions and clearances as required.

G. Submit physical samples of all items requiring selection of color or finish.

H. MAINTENANCE

I. The lift shall be cleaned regularly and inspected at intervals no longer than every 6 months.

J. WARRANTY

K. Unit shall have a 36-month limited parts warranty on every component. The warranty doesn't cover labour. Refer to product documentation.

PART 2 PRODUCTS

2.01 PLATFORM LIFT

A. Basic specifications for Savaria ACME screw drive vertical platform lift model MULTILIFT:

B. Rated load: 750 lb (340 kg)

C. Rated speed: ±8 f.p.m (0.04 m/s)

D. Usable car dimensions : 36"W x 54"L (864 x 1,372 mm)

E. Levels serviced: 2

F. Number of openings: 2

G. Car access: Front/rear or 90 exit

H. Travel: 48" (1,219 mm) or 72" (1,827 mm)

I. Operations: constant pressure

J. Drive system:: ACME screw and back-up nut

K. Power supply : 120 VAC, 20 AMPS, 1 PHASE, 60 Hz

L. Controller: Electronic-free relay logic

M. Side guard panels: 42" (1,067 mm) with metal inserts

2.02 CAR OPERATION

A. Car operating panel shall consist of constant pressure buttons or rocker switches, an emergency stop button, and an on/off key switch.

B. Emergency operation- A manual handcrank is used to lower or raise the platform in case of emergency.

2.03 ACME SCREW DRIVE

A. The screw should have a diameter of 1'' and a back-up nut shall be installed for security reasons. No brakes are required.

2.04 LEVELLING DEVICE

A. All limit switches and levelling device switches shall be located in a position to be inaccessible to unauthorised persons. They shall be located behind the mast wall and be accessible through removable panels.

2.05 CALL STATIONS

A. Provide a surface, flush, or doorframe mounted call/send station.

2.06 TERMINAL STOPPING DEVICE

A. Normal terminal stopping devices shall be provided at top and bottom of runway to stop the car positively and automatically.

2.07 GUIDE RAILS AND BRACKET

A. Guide rails and brackets shall be used to guide the platform and sling. Roller guide shoes are bolted to the platform to make it roll on the rails. Guide rails shall form part of the structural integrity of the unit and be integral to the mast enclosure, ensuring stability and minimum platform deflection when loaded.

2.08 CAR SLING

A. Car sling shall be fabricated from steel tubing 44" high (1,117 mm) with adequate bracing to support the platform and car enclosure. Roller guide shoes shall be mounted on the top and bottom of the car sling to engage the guide rails. Guide shoes to be roller type with 3" diameter wheels.

2.09 WIRING

A. All wiring and electrical connections shall comply with applicable codes. Insulated wiring shall have flame-retardant and moisture proof outer covering and shall be run in conduit, or electrical wire ways.

B. An emergency stop button, an alarm and an emergency light shall be integrated on the car station to comply with ASME A17.1 and A18.1.

PART 3 EXECUTION

3.01 EXAMINATION:

A. All site dimensions shall be taken to ensure that tolerances and clearances have been maintained and meet local regulations.

3.02 PREPARATION:

A. Pre-inspect the construction and service requirements for work by others. These requirements will be included in drawings, diagrams, engineering data sheets and special instructions before the work begins.

3.03 INSTALLATION:

A. Install all the components of the lift system that are specified in this section to be provided, and that are required by jurisdictional authorities to license the lift.

B. Trained employees of the lift contractor shall perform all installation work of this section.

C. Adjust lift for proper operation and clean unit thoroughly.

D. Instruct users and owner's maintenance personnel in proper troubleshooting and maintenance procedures.

END OF SECTION

SECTION 21 01 70

FIRE PROTECTION SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. This Section shall include all work necessary and/or required and furnish all materials and equipment for construction of a complete automatic sprinkler system for the building areas indicated. Such work includes but is not limited to the following:

1. UL/FM labeled equipment.

2. All piping and equipment required for a complete wet sprinkler system on occupied floor levels.

3. Installation of zoned test assemblies.

4. Installation of tamper and flow switches.

5. All piping and equipment for a complete wet standpipe system.

6. To coordinate with the Mechanical, Plumbing and Electrical Contractors, the installation of the mains and sprinkler piping and supports to allow installation of their work with maximized accessibility for these trades and service requirements for maintenance and repair. Prior to installing any piping or other devices, obtain written conformation from these contractors that requirements, conflicts and coordination issues have been discussed and resolved. Provide system drawings with elevation of any piping or other systems to the Mechanical Contractor so he can prepare the necessary coordination drawings that may be required. No work may be installed until the coordination issues are resolved. Any and all expense relating to coordination issues shall be born by the Contractor who did not install his work according to the coordination drawings.

7. Testing of the existing fire pump in accordance with NFPA regulations.

8. Installation and testing of a new pump controller.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

B. Sprinkler System Contractor shall provide new separate and complete sprinkler systems (wet) in satisfactory operating condition which shall conform to requirements of the following:

1. NFPA Pamphlet 13 and 14.
2. City of Wilmington Fire Marshal's Office.
3. Owner's Insurance Agency.

C. Submit working drawings to the City of Wilmington Fire Marshal's Office and obtain approval before beginning work.

D. Sprinkler systems shall be "Light Hazard Occupancy" and shall cover all rooms, closets, attic spaces, etc., in the entire building.

E. Sprinkler systems shall be “Ordinary Hazard Occupancy” for Mechanical Rooms and Storage Rooms.

1. Design and layout shall be based on Calculated System (Hydraulic).

2. Exact routing of piping shall be governed by structural conditions and obstructions.

3. The Sprinkler Contractor shall coordinate his work with the other trades so as to clear all construction items, lights, ducts, piping, etc, within the Auditorium and associated rooms.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

Submit shop drawings with Fire Marshal's approval and descriptive data, complete with product designation for the following:

1. UL/FM Listed Butterfly Valves
2. Sprinkler Heads
3. Check Valves
4. Fire Department Hose Valves
5. Fire Department Connection (Siamese or Stortz)
6. Elevator Isolation Valves
7. Controller for the existing Fire Pump

B. Submit complete sprinkler layout indicating location of heads by dimensions from walls, pipe size, and locations of valves, fittings and accessories, with Fire Marshal's approval.

C. Submit manufacturer's product data on sprinkler heads, valves, siamese connections, compressor, etc.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

1.7 TESTS AND INSPECTIONS

A. Contractor shall arrange and pay for all inspections, examinations and tests required by authorities specified herein and deliver certificates of such inspections to Owner.

B. Complete sprinkler system shall be tested in accordance with the latest requirements of NFPA Pamphlet 13, NFPA 14, and the City of Wilmington Fire Marshal's Office.

C. Fire Marshal's acceptance test shall be performed before system is placed in service and not less than five working days after Fire Marshal is notified.

1.8 QUALIFICATIONS OF CONTRACTOR

A. Contractor for sprinkler installation shall be licensed by the State of Delaware and be regularly engaged in installation of automatic sprinkler systems and other fire protection equipment.

B. Consult General Provisions for additional requirement.

PART 2 – PRODUCTS

2.1 FIRE PROTECTION PIPING MATERIALS & PRODUCTS

A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in fire protection piping systems. Where more than 1 type of materials or products are indicated, selection is installer's option.

2.2 BASIC IDENTIFICATION

A. Provide identification complying with applicable Division 22 sections in accordance with the following listings:

1. Fire Protection Piping: Plastic pipe markers.
2. Fire Protection Valves: Metallic valve tags.

2.3 BASIC PIPE AND FITTINGS

A. Comply with the weight, size and type of pipe and fittings by the latest issued schedule of NFPA Pamphlet 13, adopted by Authorities having jurisdiction.

B. All fire protection piping within all Mechanical Rooms shall be minimum Schedule 40 black iron pipe.

C. Plastic piping shall be permitted in classrooms, office spaces, etc, in accordance with the listed applications. No exposed plastic pipe will be permitted.

D. Uni-Flange type connections shall not be permitted on this project.

E. Fit fittings shall not be permitted.

F. Flex fittings shall not be permitted.

G. Segmented fittings shall not be permitted.

2.4 BASIC PIPING SPECIALTIES

A. Provide piping specialties complying with Section 220010 Basic Materials & Methods in accordance with the following listing:

Soffit enclosures with support system.
Pipe escutcheons
Dielectric unions
Drip pans
Sleeves
Sleeve seals

2.5 BASIC VALVES

A. Comply with the latest issue of NFPA 13 and NFPA 14 adopted by the Authorities having jurisdiction for the following:

Control Valve – Butterfly Valve
Check – Swing Valve
Hose valves

2.6 SPECIAL VALVE & ASSEMBLIES

A. Provide valves, UL listed, in accordance with the following listing. Provide sizes and types which mate and match piping and equipment connections.

B. Siamese Connection: 6" x 2-1/2" x 2-1/2" back outlet, cast brass two-way inlet body with drop clappers, polished bronze plate with letters "AUTO SPKR" double female snoots with rigid end threaded to match local fire department, plugs and chain.

2.7 FIRE PROTECTION SPECIALTIES

A. Provide fire protection specialties, UL listed, in accordance with the following listing. Provide sizes and types which mate and match piping and equipment connections.

B. Automatic Sprinklers: Sprinkler heads shall be UL approved for intended use and have temperature ratings as indicated or required for location.

Provide the following type sprinkler heads as indicated:

Upright: Viking “Micromatic Model "M" bronze finish, 1/2" orifice.
Pendent: Viking “Micromatic Model "M" chrome plated, 1/2" orifice and escutcheon plate.
Pendent: Viking “Microfast Model “M” quick response with all white finish including escutcheon plate, ½” orifice.
Sidewall: Viking “Micromatic Model “M”, chrome plate, ½” orifice.
Sidewall: Viking “Microfast Model “M” – quick response, all white finish including escutcheon plate, ½” orifice.
Sidewall: (Extended Coverage) Viking “Microfast Model “M”, quick response, all white finish, extra large orifice.
Semi-Recessed: Viking “Silhouette Model A-1 quick response, chrome plated, ½” orifice.
Full Concealed: Viking “Horizon-Mirage” large orifice quick response, white cover plate.

C. Sprinkler Cabinet and Wrench: Furnish steel, baked red enameled, sprinkler box with capacity to store 10 sprinklers and wrench sized to sprinklers.

2.8 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering fire protection specialties and or equipment which may be incorporated in the work include and are limited to the following:

Sprinkler Heads

Central
Viking
Star-Chemetron
Automatic Sprinkler

Fire Protection Specialties

W.D. Allen
Sierra
Elkhart
Potter-Roemer
Seco

Special Valves

Mueller Valve Co.
ITT Grinnel-Kennedy

Soffit System

Soffit Steel

PART 3 – EXECUTION

3.1 INSTALLATION OF BASIC IDENTIFICATION

A. Install fire protection signs on piping in accordance with ANSI/NFPA 13.

3.2 FIRE SPRINKLER PIPING SYSTEMS

A. Comply with requirements of ANSI/NFPA 13 for installation of fire sprinkler piping materials. Install fire sprinkler piping products where indicated, in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that fire sprinkler piping complies with requirements and serves intended purposes.

B. Coordinate with ceiling space available, other trades, including plumbing piping, as necessary to interface components of fire sprinkler piping properly with all other items of construction.

C. Install drain piping at low points of fire sprinkler piping.

D. Provide auxiliary drains as required.

E. Install system valve assemblies where indicated.

F. Install siamese connection where indicated.

G. Install the following type sprinkler head in the following locations:

H. Install sprinkler in acoustical tile suspended ceilings, in the center of the tile with heads installed in such a way that the requirements for both coverage and symmetry are fulfilled.

I. No portion of the wet sprinkler system shall be installed within the attic and/or potential freezing areas of the building without being provided with freeze protection.

J. Provide tamper and flow switches where indicated or noted. All switches shall be wired by the Fire Alarm System Contractor. Provide all coordination and communication with the Fire Alarm Contractor for number and relocation of all switches.

K. Install new 4” risers. See Contract Drawings.

L. Install sidewall sprinkler heads in all soffits installed.

3.3 INSTALLATION OF SUPPORTS, ANCHORS AND SEALS

A. Comply with the latest issue of NFPA adopted by the Authorities having jurisdiction.

3.4 INSTALLATION OF FIRE PROTECTION SPECIALTIES

A. Comply with the latest issue of NFPA adopted by the Authorities having jurisdiction.

3.5 ADJUST & CLEAN

A. Sprinkler Piping Flushing: Prior to connecting sprinkler risers for flushing, flush water feed mains, lead-in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system, as required to remove foreign substances, under pressure as specified in ANSI/NFPA 13. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinklers.

3.6 FIELD QUALITY CONTROL

A. Hydrostatic Testing: After flushing system, test fire sprinkler piping hydrostatically, for period of 2 hours, at not less than 200 psi or at 50 psi in excess of maximum static pressure when maximum static pressure is in excess of 150 psi. Check system for leakage of joints. Measure hydrostatic pressure at low point of each system or zone being tested.

3.7 EXTRA STOCK

A. For each style and temperature range required, furnish additional sprinkler heads, amounting to 1 unit for every 100 installed units.

END OF SECTION 21 01 70

SECTION 22 00 00

GENERAL PROVISIONS – PLUMBING/FIRE PROTECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and all other applicable Divisions, apply to work of this Section.

B. This specification or drawing and the design features or resulting construction disclosed, are the property of Furlow Associates, Inc., and shall not be reproduced without written permission.

C. All fire protection suppression systems shall be part of and included in all of the following 220000 thru 220191 Sections.

1.2 WORK INCLUDED

A. Provide labor, materials, equipment and supervision necessary to install complete operating Plumbing and Fire Protection Systems as indicated the drawings and specified herein, including all work at the site and within the proposed construction areas to accomplish the required work.

1.3 REGULATIONS, CODES AND STANDARDS

A. Work shall be performed in accordance with latest adopted codes, regulations and ordinances by authorities having jurisdiction. Observe all safety regulations.

B. Latest editions of any referenced standards shall govern.

C. Obtain all municipal and/or the Authorities Having Jurisdiction permits and inspection certificates and pay all charges.

D. Make or arrange for any/or all inspection agency reviews or visits and pay all charges. This includes communication with each respective agency and/or utility to verify the project system work, coordination responsibilities, fees, back charges, etc., required.

E. All fees and back charges shall be verified during the bidding phase of the work. Any discrepancy of this item between any utility, inspection agency and the Contractor shall be brought to the attention of the A/E prior to bid opening.

F. Submission of a bid will be deemed evidence of having complied with these requirements.

1.4 RELATED WORK

A. Refer to equipment shown or specified in all other applicable Divisions that require Plumbing and Fire Protection services.

B. Refer to work related to Plumbing and Fire Protection as shown on the following contract drawings:

Architectural & Structural
HVAC
Electrical

1.5 COORDINATION

A. The Mechanical, Plumbing and Electrical Contractors are responsible to coordinate all manufacturer's recommended circuit breakers, starters, disconnects and fuse sizes for all equipment. Submission of a shop drawing will certify that this has been completed. Any necessary changes required will be included as part of this contract.

B. Plumbing and Sprinkler Contractors shall coordinate scheduling, submittals and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of independent work elements, with provisions to accommodate items that may be installed at a later time.

C. Plumbing and Sprinkler Contractors shall verify utility requirements and all characteristics of operating equipment are compatible with the building utilities. Coordinate the work of all sections related and required for installing, connection and placing in service of all equipment.

D. Plumbing and Sprinkler Contractors shall coordinate all space requirements, supports and installation of all mechanical, electrical, plumbing and fire protection work, which are indicated diagrammatically on the Drawings. Verify routing of all pipes, ducts, conduits and equipment connections. Maximize accessibility for other work, and service requirements for maintenance and repairs.

E. Obtain written confirmation from all related trade Contractors and the Owner or his representative that requirements, conflicts and coordination issues have been discussed and resolved.

1.6 SUBMITTALS

A. Shop Drawings & Product Data:

1. Shop drawings and product data shall be submitted in accordance with Division 22 specifications except where herein modified.

   NOTE: Submittals will only be reviewed once and resubmittals will be reviewed once. Any other submittals will be billed to the Contractor at the Engineer's standard rates.

2. Listed are the required shop drawings and reports required for this project. The Engineer/Owner shall reserve the right to require additional submissions not listed below:

   - All fixtures, equipment and associated devices so listed on the Fixture Schedule on Drawing P-100.
   - Insulation

- All specified piping systems.
- All specified valves.
- Hanger and supports.
- Piping labels and identification.
- Sprinkler System and all related data, devices, switches and trimmings.
- Testing reports.
- Sterilization report.
- Operating/Maintenance manuals.
- As-Built Drawings: Plumbing and Fire Protection.

3. Submittals comprising complete catalog cuts, shop drawings and performance test data for Plumbing materials and equipment as required by other sections of Division 22, shall be submitted for review checking. The Contractor shall review these for conformance to contract documents prior to submission and affix contractor's signature to each submittal certifying that this review has been done. By approving and submitting shop drawings, product data, samples and similar materials, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction data that relates to the work, and has checked and coordinated this information with all of the requirements contained in the contract documents for the work of all trades.

4. All submittals shall have the following identification data, as applicable, contained therein or permanently adhered thereto.

   a. Project name.

   b. Project number.

   c. Sub-contractor's, vendor's and/or manufacturer's name and address.

   d. Product identification.

   e. Identification of deviation from contract documents.

   f. Applicable contract drawings and specification section number.

   g. Shop drawing title, drawing number, revision number, and date of drawing and revision.

   h. Resubmit revised or additional submittals as requested.

   i. Wherever shop drawings or vendor's standard data sheets indicate work to be done "by others", it shall be the responsibility of the contractor making the submission to identify by name, the contractor who is to do this work. If the contractor named is other than the contractor making the submission, the shop drawing submission must be reviewed by the named contractor and bear his mark of approval, prior to submission to the Architect/Engineer.

   j. Where equipment proposed differs from that shown on the drawings or specified, he shall submit for approval drawings showing the manner in which the layout is affected by the substitution.

k. The Contractor shall keep one copy of approved shop drawings at the job site,, filed in a suitable metal container. The shop drawings shall be cataloged and kept in good repair, and shall be available for use by the Owner, Architect and Engineer.

l. No equipment shall be ordered, fabricated, etc., before approval of shop drawings.

B. Contractor is responsible for the shop drawing coordination and interface with the work of other contracts and adjacent work. The relationship of Contractor's work shall be verified as it relates to adjacent and critical features of the work of this and all contracts and materials.

1.7 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in all other applicable Divisions. In addition, refer to specifications for special guarantees.

B. Wherever in the specification sections of this division, reference is made to a specific warranty period, this warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the contract documents.

C. Contractor to include an 11 month "walk-thru" of the building systems with representatives of the School District, Architect, Engineer and the Construction Manager. The purpose is to establish a list of corrective work that relates to operational issues, material/installation deficiencies.

1.8 SITE INSPECTION

A. The Contractor shall visit the site, inspect, and become aware of all conditions which may affect the work during the estimation phase of his work and prior to bid openings. Investigate utilities, protection requirements for adjacent facilities, storage locations, and access to the construction area.

B. Submission of a bid will be deemed evidence of having complied with this requirement.

1.9 SUBSTITUTIONS

A. Whenever a material, article, piece of equipment or system is identified in the following specification or indicated on the drawings by reference to manufacturers' or vendors' names, trade names, catalog numbers or the like, it is so identified for the purpose of establishing the basis of the Bid.

B. Substitution approval must be obtained and included as an addendum item prior to the submission of the bid. An approved substitution shall not be considered as an approval for the Contractor or an equipment vender to deviate from the written portion of the specifications unless so stated in the addendum.

C. The drawings illustrate the space allocated for equipment and the Contractor shall install the equipment accordingly. If changes are required in the building or arrangement due to substitution of equipment, the Contractor making the substitution must pay for the necessary modifications.

D. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements as indicated on all contract documents and as described within the specifications. This shall include, but shall not be limited to space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items furnished and installed by other trades. If the manufacturer or related bidding contractor does not comply with these requirements, then they shall be responsible for any and all additional costs associated with the changes required by other trades.

1.10 LUBRICATION

A. Furnish, install and maintain all required lubrication of any equipment operated prior to acceptance by the Owner. Lubrication shall be as recommended by the equipment manufacturer.

B. Provide one year's supply of lubricants to Owner at date of acceptance.

C. Verify that required lubrication has taken place prior to any equipment start-up.

1.11 EQUIPMENT START-UP

A. Verify proper installation by manufacturer or his representative.

B. Advise General Contractor 2 days prior to actual start-up.

C. Verify proper operation. Obtain signed statement by manufacturer or his representative that equipment is operating within warranty requirements. Submit statement to General Contractor.

1.12 OPERATION & MAINTENANCE INSTRUCTIONS

A. Properly and fully instruct Owner's personnel in the operation and maintenance of all systems and equipment.

B. Insure that the Owner's personnel are familiar with all operations to carry on required activities.

C. Such instruction shall be for each item of equipment and each system as a whole.

D. Provide report that instruction has taken place. Include in the report the equipment and/or systems instructed, date, contractor, Owner's personnel, vendor, and that a complete operating and maintenance manual has been reviewed.

E. Manual shall include all instructions on operation, maintenance, repair parts list, lubrication requirements, brochures, catalogue cuts, wiring diagrams, piping diagrams, control sequences, service requirements, names and addresses of vendors, suppliers and emergency contacts. Three manuals shall be provided.

F. Submit manuals for review prior to operating instruction period. Manuals shall be 8-1/2 x 11" with hard cover, suitably bound.

G. Provide to the Owner any special tools necessary for operation and routine maintenance of any of the equipment.

H. Furnish three (3) copies of a professionally taped video and three (3) copies of professionally prepared drawings demonstrating the following:

- Location of main shut-off valves
- Procedures for equipment start-up and seasonal shut-downs.
- Procedures for maintenance.
- Provide written version of all procedures included in video.

The above should cover all equipment/systems including, but not limited to the following:

- Sprinkler Systems to include the Fire Pump Controller
- Flush valves
- Manual Faucets
- 3-Person Lavatory System
- Elevator Sump Pump System & Alarm Panel

1.13 TOOLS

A. All equipment furnished by the Contractor which requires special tools or devices other than those normally available to the maintenance or operating staff shall be furnished in duplicate to the Owner, sufficiently marked, packed or boxed for staff usage. The tools provided shall be listed by the Contractor identified as to their use or the equipment applicable in a written transmittal to the Owner.

1.14 CLEANING AND FINISHING

A. After equipment start-up and all operating tests have been made and the system pronounced satisfactory, each respective Contractor shall go over the entire project, clean all equipment, etc., installed by him and leave in a clean and working condition. Any surfaces found marred after this final cleaning shall be refinished or replaced by each Contractor at no cost to the Owner.

B. Provide for the safety and good condition of all materials and equipment until final acceptance by the Owner. Protect all materials and equipment from damage. Provide adequate and proper storage facilities during the progress of the work. Special care shall be taken to provide protection for bearings, open connections, pipe coils, pumps, compressors and similar equipment.

C. All NEW fixtures, piping, finished surfaces and equipment installed shall have all grease, adhesive labels and foreign materials removed.

D. All new piping installed shall be drained and flushed to remove grease and foreign matter. Pressure regulating assemblies, traps, flush valves and similar items shall be thoroughly cleaned. Remove and thoroughly clean and reinstall all liquid strainer screens after the system has been in operation ten (10) days.

E. When connections are made to existing systems, the Contractor shall do all cleaning and purging of the existing systems required to restore them to the condition existing prior to the start of work.

F. Clean-up: Remove from the premises, all unused material and debris resulting from the performance of work under this section.

PART 2 – PRODUCTS

2.1 GENERAL

A. All material and equipment shall be new and of present day manufacture, and shall conform to accepted standards of the trade where such a standard has been established for the particular type of equipment or material.

B. Whenever equipment or material is referred to in the singular, such as "the plumbing fixture", it shall be deemed to apply to as many such items as necessary to complete the work.

2.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During loading, transporting and unloading exercise care to prevent damage to material.

B. Store all materials in dry enclosures or under protective coverings out of way of work progress.

C. Material shall not be allowed to be stored directly on ground.

D. Deliver in manufacturer's original cartons or on skids.

E. Handle and protect so as to prevent damage to product or any surrounding material.

2.3 CONCRETE

A. Concrete if used on this project, shall be in accordance with Section 033000.

B. The 28-day minimum compressive strength shall be 3000 psi.

PART 3 – EXECUTION

3.1 PROTECTION

A. Plug or cap open ends of piping systems above or below slab.

B. Stored materials shall be covered to prevent damage by inclement weather, sun, dust or moisture.

C. Protect all installed work until accepted in place by the Owner.

D. Plates, polished metal escutcheons and other finished devices shall not be installed until masonry, tile, and painting operations are complete unless otherwise protected.

E. Protect all work from operations which may cause damage such as hauling, welding, soldering, painting, insulating and covering.

F. Do not remove protective material until equipment is placed in service.

3.2 WORKMANSHIP

A. Install all work neat, trim and plumb with building lines.

B. Install work in spaces allocated.

C. Cutting and patching shall be performed by skilled tradesmen normally employed for the work involved.

3.3 EXCAVATION

A. The excavation shall be of the open-trench method and to the depths and widths as may be necessary. The Contractor shall do all excavation required in connection with his work. Bottoms of trenches shall be excavated to a uniform grade. All materials excavated shall be deposited on the side of the trenches and beyond the reach of the slides. Excavated material shall not be piled where it will interfere with traffic. If rock is encountered, it shall be removed by the General Contractor. See provisions in Division 2.

B. No piping shall be bedded directly on rock. They shall be cushioned by a 6-inch layer of crushed stone or gravel of selected grade, of size to pass through 3/4" mesh sieve. Not less than 30% shall be fine which will pass through a 3/8" mesh sieve.

3.4 SHORING AND PUMPING

A. The Contractor shall provide all shoring, bracing or sheet piling necessary to maintain the banks of his excavation and shall take out same as the work progresses and filling in has been accomplished. Shoring shall be in accordance with OSHA Standards.

B. The arrangement of shoring must be such as to prevent any movement of the trench banks and consequent strains on the conduits. Shoring shall be provided to prevent damage to work installed by other trades.

C. The Contractor shall do all pumping required to keep his excavations free of water. The water shall be conveyed in piping or watertight troughs a sufficient distance that it will flow from the site and not affect other work being performed.

3.5 BACKFILLING

A. After work in trenches has been completed, they shall be filled with select fill in 8" layers and shall be pneumatically tamped before the next layer of material has been filled in. The backfill shall be free of excavated rock, cinders, stones, brickbats or other debris.

B. Wherever rock is removed, the Contractor shall secure and fill select clean earth to a minimum depth of 3'-0" above the top of the pipe. Unless otherwise indicated, no rock shall be deposited in

the trench fill. This clean earth fill shall be procured other than from the site unless permission for earth borrow from the site is granted by the Architect. If site borrow is permitted, the topsoil removal, relocation and finished grading will be accomplished as directed by the Architect.

C. Under no circumstances shall excavated material be left where it will interfere with the Owner's or other Contractor's operations.

D. All earth and other materials taken from the trenches and not required for backfilling shall be deposited where directed, or removed from the premises as directed by the Architect.

E. Any rock removed from the excavation shall be removed from the project site by the Contractor.

F. Trenches which pass under wall footings or within 18" of column footings shall be backfilled with lean concrete. To secure adequate foundation support, the method and depositing of the concrete fill shall be as directed by the Architect. To prevent the concrete from adhering to the pipes, necessary pipe protection shall be applied.

3.6 EQUIPMENT SETTING

A. Furnish and install as a minimum, a 4 inch concrete pad beneath all floor-mounted equipment. Install anchor bolts in pour.

B. Furnish and install as a minimum, spring vibration isolation under any equipment 10 HP and over and rubber in shear vibration isolation on any equipment up to 10 HP.

C. Concrete shall be 3,000 psi, 28 day compressive strength in accordance with ACI-613. Reinforce with No. 4 rod 12" on centers both ways or as otherwise detailed.

3.7 FASTENERS, HANGERS AND SUPPORTS

A. Furnish and install all hangers and supports required to suspend, mount, or hang the work.

B. Furnish and install all miscellaneous steel angles, channels, beams, clips, brackets and anchors necessary to hang or support the work. Provide submissions for review.

C. Install concrete inserts before concrete is poured.

D. Drilled inserts shall not be loaded more than 1/4 rated capacity or 200 pounds.

E. Power-driven fasteners shall not be allowed for piping larger than 2 inch, or equipment. When used they shall not be loaded more than 1/8 rated capacity or 200 pounds.

F. All hangers, miscellaneous steel, braces and supports shall be galvanized, cadmium plated, or primed steel. Copper tubing shall be supported with copper hangers. No direct contact of dissimilar metals between the piping system and its hanger support shall be permitted.

G. Piping shall be supported from adjustable clevis type hangers with insulation pipe saddles. Where hangers are 18” or longer, provide lateral bracing at every fourth hanger. See IPC Pipe Support Table below:

PIPE SUPPORT SPACING

Material	Horizontal Max. Feet	Vertical Max. Feet
ABS Pipe	4	10
Aluminum	10	15
Brass	10	10
Brass Tube up to 1-1/4”	6	10
Brass Tube over 1-1/2”	10	10
Cast Iron	5	15
Copper up to 1-1/4”	6	10
Copper over 1-1/4”	10	10
CPVC Up to 1”	3	10
CPVC Over 1”	4	10
Lead Pipe	Continuous	4
PB Pipe/Tubing	2.6 ft. (32”)	10
PVC Pipe	4	10
PEX	2.6 ft. (32”)	10
Steel Tubing	8	10
Steel Pipe	12	15

H. Support vertical piping at floor levels using approved riser clamps. Clamp material shall be compatible with pipe material. Maximum vertical spacing shall be10’-0”.

3.8 SLEEVES

A. Provide each pipe passing through a masonry or concrete wall, floor or partition with a sleeve made from standard weight steel pipe for pipe with smooth edges, securely and neatly cemented in place. Provide each pipe passing through a frame or metal partition with a sleeve made from No. 22 gauge galvanized sheet metal, securely fastened in place.

B. Pipe passing through foundation wall or under foundation shall be provided with relieving arch or steel pipe per IPC Section 305.5.

C. Be responsible for the proper location and alignment of all sleeves.

D. Provide hydrostatic seals for sleeves passing through outside walls, below grade, or through hydrostatically sealed slabs or floors on grade. Provide fire-rated seals for all other sleeves.

E. Install both piping and sleeve seals so as to maintain integrity of seals with expansion and contraction of piping.

F. Set floor sleeves flush with floor surface in finished areas, 1" above the finished floor in kitchens, cafeterias, and similar service areas unless such areas are slab-on-grade; 1" above the floor in mechanical rooms, pipe chases, pipe spaces and other unfinished areas, unless otherwise indicated, and flush with the underside of slabs. Extend wall and partition sleeves through and cut flush with each surface unless otherwise indicated or specified.

G. Select sleeves two pipe sizes larger than any pipe that is to remain uncovered, unless otherwise required by the sealing method specified. Where pipes are to be covered, provide sleeves large enough to allow the covering to pass through the sleeves with sufficient clearance for sealing as specified hereinafter. Size sleeves for branch piping from vertical risers large enough to permit vertical expansion at the riser.

H. Place sleeves imbedded in concrete floors or walls in the forms before concrete is poured; sleeves shall have integral waterstop flanges, where they are to receive either watertight or hydrostatic seals.

I. Install sleeves passing through above-grade floors of mechanical rooms, toilet rooms, kitchens or similar service areas where liquid leaks or spillover may occur in a watertight manner. Sleeves shall be such that waterproofing membrane can be flashed around and into the sleeve where necessary.

J. Seal sleeves for pipes passing through ceiling air plenum walls or the floor above air tight in a manner similar to that specified for fire-rated sleeves.

K. Hydrostatic Sealing Method: Provide compressible synthetic rubber seals, equivalent to LINK SEAL, manufactured by the Thunderline Corporation, or THRUWALL manufactured by O.Z. Gedney. Install seals in accordance with the manufacturer's recommendations to provide air tightness aboveground and hydrostatic sealing belowgrade. Caulking or other type mastic is not acceptable.

L. Fire-Rated Sealing Method:

1. Sleeves, openings and sealants shall comply with applicable codes, recommended practices and standards, and manufacturer's instructions. Fire sealants shall have ability to prevent spread of flame, smoke or water throughout the penetration and shall pass 3 hour test, UL test ASTM E814 and UL 1479.

2. Products: Chase Corporation CTC PR-855, O. Z. Gedney CRS/CAFS, 3M Electro-Products Division Putty 303 or Caulk CP25 penetration sealing kits, General Electric Company sealants type RTV-850, 6428 or 7403, Thunderline Corporation "Link-Seal Pyro-Pak". Installation and type of sealant to be used as recommended by the manufacturer.

3. Expansion collars, fire seal/firestop collars – ASTM E814 (UL1479). Spec Seal Corporation, Inc. (plastic pipe).

3.9 PLATES

A. Furnish and install chrome plated plates wherever piping passes into finished area.

B. Plates shall be securely fastened to piping or building construction.

C. Floor plates shall cover 1 inch sleeve extension.

3.10 OFFSETS, TRANSITIONS, MODIFICATIONS

A. Furnish and install all offsets necessary to install the work and to provide clearance for other trades.

B. Maintain adequate headroom and clearance.

C. Incidental modifications necessary to the installation of the systems shall be made as necessary and as approved by the Architect.

3.11 RECESSES

A. Furnish information to the General Contractor as to sizes and locations of recesses required to install panels, boxes, and other equipment or devices which are to be recessed in walls.

B. Make offsets or modifications as required to suit final locations.

3.12 LABELING

A. All Plumbing equipment such as pumps, and devices requiring identification for operating procedures shall be provided with permanent black laminated micarta white core labels with 3/8 inch letters.

B. This shall also apply to all controllers, remote start/stop pushbuttons and equipment cabinets.

3.13 FLASHING AND COUNTERFLASHING

A. Roof drains, vents, roof curbs, etc., shall have counterflashing fittings. General Contractor shall provide flashing.

B. Piping and conduit thru the roof shall be flashed by the General Contractor. Furnish and install counterflashing.

3.14 ACCESS

A. Locate all equipment, valves, devices and controllers which may need service in accessible places.

B. Where access is not available, access panels shall be provided. Furnish access doors to the General Contractor for installation.

C. Access doors shall be Elmdor, Karp Co., MIFAB or Controlled Air Manufacturing Limited, with 16 gauge frames and 14 gauge steel door, prime painted.

D. Maintain required access clearances.

3.15 WIRING

A. Packaged plumbing system equipment shall be furnished with disconnect switches, and magnetic starters, factory furnished and wired by the unit manufacturer.

B. All control wiring shall be furnished and installed under this Division of the work.

C. All wiring shall be in accordance with the National Electrical Code and as recommended by the equipment manufacturer.

3.16 UTILITIES

A. Do not interrupt any utility or service to the Owner without adequate previous notice and schedule.

B. Arrange and pay for the relocation, disconnection or removal of, or relocate, disconnect or remove existing utilities and services where such work is shown or where such utilities or services interfere with new construction, whether or not shown. Provide all excavation, backfilling and paving required by such work.

C. Perform alteration of utilities and services in accordance with the rules, regulations and requirements of the involved utility companies, regulatory agencies having jurisdiction.

3.17 CUTTING AND PATCHING EXTERIOR SURFACES

A. This Contractor shall be responsible for returning disturbed paved and/or grass areas to original condition where excavation for utilities has been required.

B. Cut and patch paved areas to match original surface.

C. Properly tamp backfill before finishing or repairing disturbed area surfaces.

3.18 OPENINGS - CUTTING, REPAIRING

A. This contractor shall cooperate with the work to be done under other sections in providing information as to openings required in walls, slabs and footings for all piping and equipment, including sleeves where required.

B. Any drilling or cutting required for the performance of work under this Section, shall be the responsibility of this Contractor and the cost thereof shall be borne by him.

C. Holes in Concrete: Sleeves shall be furnished, accurately located and installed in forms before pouring of concrete. This contractor shall pay all additional costs for cutting of holes as the result of the incorrect location of sleeves. All holes through existing concrete shall be either core drill or saw cut. All holes required shall have the approval of the Structural Engineer prior to cutting or drilling.

D. It shall be the responsibility of this Contractor to ascertain that all chases and openings are properly located.

3.19 GUARANTEE

A. All materials and equipment provided and/or installed under this section of the specifications shall be guaranteed for a period of one year from the date of acceptance of the work by the Owner unless otherwise specified in other applicable Divisions. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without any cost to the Owner. Any defective materials or inferior workmanship noticed at time of installation and/or during the guarantee period shall be corrected immediately to the entire satisfaction of the Owner.

In the event of occupancy by the Owner prior to final acceptance of the project, the guarantee date for equipment placed in operation shall be mutually agreed to by the Contractor and the Owner's representative.

B. Contractor to include an 11 month “walk-thru” of the building system with representatives of the School District, Architect, Engineer and the Construction Manager. The purpose is to establish a list of corrective work that relates to operational issues, material/installation deficiencies.

3.20 DRAWINGS

A. The Plumbing and Fire Protection Systems are indicated on the Contract Drawings. Certain pertinent information and details required by the Plumbing and Fire Protection Work appear on the Architectural, Structural and Electrical Drawings; become familiar with all Drawings; and incorporate all pertinent requirements.

B. Drawings are diagrammatic and indicate the general arrangement of systems and requirements of the Work. Do not scale Drawings. Exact locations of fixtures and equipment, not specifically shown shall be obtained before starting work.

C. When indicated on the drawings, plumbing riser diagrams are completely diagrammatic and indicate the intent of the work for both the Contractor, L&I review agencies and/or Authorities Having Jurisdiction. Where valves, shock absorbers, incidental equipment, devices, etc., including execution notes are indicated on the riser diagrams, they shall be so required and installed as part of the system work.

3.21 RECORD DRAWINGS

A. As-Built record drawings, showing dimensions, locations and depth of all buried and concealed piping, plugged outlets and equipment shall be kept up to date. Master copy shall be kept on the job. No backfilling of trenches shall be permitted until as-built drawings are approved as up-to-date by the Owner/Representative. No plumbing progress payments shall be approved unless as-built drawings are up- to-date. Depth of sewers shall be from a permanent bench mark as shown on the contract drawings. Refer to project record drawings under General Conditions.

END OF SECTION 22 00 00

SECTION 22 00 10

BASIC MATERIALS AND METHODS - PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 REFERENCE

A. Install all piping, fixtures, equipment, etc., to meet the requirements of the following:

City of Wilmington Department of License and Inspection
New Castle County Department of Sewers
City of Wilmington Plumbing Code
City of Wilmington Fire Marshal's Office
International Plumbing Code (All applicable sections)
International Mechanical Code (All applicable sections)
NFPA
OSHA

All requirements of the above governing agencies shall be in compliance with the latest issues, rules or regulations in effect.

B. Appliances and materials governed by UL requirements shall meet such requirements and bear the label.

1.3 QUALITY ASSURANCE

A. Provide adequate supervision of labor force to assure all aspects of specifications are being fulfilled.

B. Insure that all work and equipment is installed in accordance with manufacturer's warranty requirements.

C. Replace all pipes and fittings shown to be defective as a result of testing.

1.4 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Manufacturer's Product Data on all pipe and fittings to be used in project.
2. Manufacturer's Product Data on all valves to be used in project.

1.5 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 CAST IRON PIPE AND FITTINGS

(Note: Any cast iron piping made or marked "CHINA" will NOT be acceptable on this project)

A. Aboveground:

1. Pipe & Fittings: Hubless cast iron, CISPI 301, ASTM A-74 and ASTM A-888 shall be marked with the collective trademark of the Cast Iron Institute (soil pipe).

2. Joints: Neoprene sleeve and stainless steel shield and clamp assembly, CISPI 310, ASTM-1277.

B. Below grade and/or slab: (Contractor's Option)

1. Bell and Spigot: Service weight bell and spigot pattern ASTM-74 with compression type neoprene gaskets ASTM C-564.

2. Hubless: Hubless cast iron pipe CISPI 301, with heavy duty 3.04.016 stainless steel bands for below-grade installation. Elastomeric seal component ASTM C-564 and CSA B-602.

3. Hubless Joints: Cast iron CISPI 310 and as TM C-1277.

4. PVC DWV pipe and fittings, Schedule 40, ASTM D-2665, D2949, F891 and CSA B181.2.

5. Corrosion protection shall be in accordance with IPC 305.1. Provide appropriate wrapping or sheathing when pipe is exposed to lime and acid of concrete, cinder or other corrosive materials.

6. Protection of all below-grade storm and sanitary shall be in accordance with IPC Section 305.

C. Corrosion protection shall be in accordance with IPC 305.1. Provide appropriate wrapping or sheathing when piping is exposed to lime and acid of concrete, cinder or other corrosive materials.

2.2 COPPER TUBING

A. Domestic hot, cold and recirculated water:

1. Aboveground:

a. Tubing: Hard-drawn, seamless ASTM B-88, Type "L".
b. Fittings: Solder joint wrought copper ANSI B-16.22.

c. Joints: Lead-free solder 410°, ASTM B-32 alloy designation “TC”, ASTM B-828.
d. Flux: Non-toxic and non-corrosive, ASTM B-813.

2. Underground:

a. Tubing: Soft-drawn, seamless ASTM B-88, Type "K".
b. Fittings: Solder joint wrought copper ANSI B-16.22.
c. Joints: Lead-free solder 410°, ASTM B-32, ASTM B-828.
d. Flux: Non-toxic and non-corrosive, ASTM B-813.

B. Drainage and vent piping:

1. Aboveground:

a. Tubing: Hard-drawn seamless ASTM B-88, ASTM B-75, Type "M" and DWV as pipe size permits.
b. Fittings: Solder joint cast copper drainage type ANSI B-16.29.
c. Joints: Soldered, 95/5 tin-antimony ASTM B-828, ASTM B-32.
d. Flux: Non-toxic and non-corrosive, ASTM B-813.

C. Solder/Flux: See Paragraph 3.4 of this section for Soldering/Brazing.

2.3 PVC GRAVITY SEWER PIPE (BELOW GROUND ONLY)

A. Pipe: Unplasticized polyvinyl chloride (PVC) with integral wall bell and spigot joints.

B. Material: ASTM D-3034 for SDR 35, colored green for inground identification as sewer pipe.

C. Joints: Two sections of pipe shall be assembled in accordance with manufacturer's recommendations and tested as per ASTM D 3212 for use with flexible elastomeric seals.

D. Sizes: For site drainage systems 4" to 15".

E. Additional compliances:

1. Drop Impact Test - ASTM D-2444
2. Pipe Stiffness - ASTM D-2412
3. Temperature for Testing - Designed to pass all tests at 73 degrees F (+/- 3 degrees F).

2.4 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. Underground – Drainage & Vent (Sanitary) IPC Table 702.2

1. ASTM D 2665
2. ASTM D 2949
3. ASTM F 891
4. CSA CAN/CSA-B 181.2

B. Building Sewer Pipe (Near Water Service) IPC Table 702.3 (DWV)

1. ASTM D 2665
2. ASTM D 2949
3. ASTM D 3034
4. ASTM F 891
5. CSA B182.2
6. CSA B 182.4 (Ribbed Sewer Pipe & Fittings)

C. Fittings:

1. ASTM D 3311
2. ASTM D-2665
3. ASTM F-1866

D. Solvent Cement: (All Purpose on ABS, PVC and CPVC)
Potable Water, Sewer, Drain Waste and Vent

1. ASTM D-2564, D-2235 and F-493
2. CSA B137.3
3. CSA B181.2 or B182.1 (Sanitary Pipe only)
4. ASTM D2855
5. CSA B181.1

E. Primers: (PVC and CPVC)

1. ASTM F 656, purple color, SCAQMD Rule 1168 and OTC Regulations for VOC emission levels. NSF Standard 61 PW, DWV, Sewer.

F. Uniformity: To insure installation uniformity, all piping components shall be of one manufacturer.

2.5 VALVES (Copper Systems) – Solder ends of Threaded

A. Valves listed below shall be for domestic water systems and comply with the latest requirements of NSF 61-8. Refer to individual sections for gas valves.

B. Ball Valves: NIBCO two piece, full port, 600 psi WOG rated, cold non-shock valve with reinforced TFE seals, 316 stainless steel ball, Eco-brass body, ASTM 584, Alloy C87850, solder ends, or threaded non-blowout stem design. Acceptable NIBCO figure numbers: T/S 685-80-66-LF; T/S 595-Y-66-LF (3 piece).

C. Check Valves: NIBCO Class 125, Eco-brass body, ASTM 584, Alloy C87850, swing type, Y Pattern, threaded cap access. Acceptable NIBCO figure number: T/S 413-LF.

D. Gate Valves: NIBCO Class 125, Eco-Brass body, ASTM 584, Alloy C87850, Rising Stem. Acceptable NIBCO figure number: T/S 113-LF.

E. Balance Valves: All balance valves shall be provided with a memory stop feature with calibrated name plate to assure specific valve setting. Bronze body/brass ball, carbon filled TFE seat rings. NIBCO, Bell & Gosset, Accu-Flow, Taco or Flow Design "Accusetter". Acceptable NIBCO figure numbers: T/S 1710, F/G 737.

F. Strainers:

1. Class 125 Bronze Y-Strainer, body to be ASTM B584 or B62 bronze with threaded, solder or female press end connections and .033 inch perforated type 304 stainless steel screen or 20 mesh type 304 stainless steel screen accessible without removing the strainer from the line. Acceptable Figure numbers: NIBCO Fig. S/T-221, S/T-222, PF-221/222-A,B.

2. Class 125 Flanged Cast Iron Y-Strainer, body to be ASTM A-126 Class B cast iron. End connections to be Class 125 flanged, tapped bolted bonnet with plug. Screen shall be .033 inch perforated type 304 stainless steel screen or 20 mesh type 304 stainless steel screen accessible without removing the strainer from the line. Acceptable Figure numbers: NIBCO Fig. F 721-A.

3. Class 250 Threaded Cast Iron Y-Strainer: Strainer body to be ASTM A-126 Class B cast iron. End connections to be Class 250 threaded, tapped screw-in bonnet with plug. Screen shall be .033 inch perforated type 304 stainless steel screen or 20 mesh type 304 stainless steel screen accessible without removing the strainer from the line. Acceptable Figure numbers: NIBCO Fig. T-751-A

G. VALVES (Copper Systems) – Press Fit

1. Valves listed below shall be for domestic water systems and comply with the latest requirements of NSF-61-8.

a. 2 Inch and Smaller Ball Valves (On/Off):

Ball Valves with male or female press to connect shall be rated at 200 PSI CWP to +225°F maximum. Valves shall be manufactured in accordance with MSS SP-110 and constructed of dezincification resistant cast bronze bodies. Brass with more than 15% zinc shall not be approved. Valve shall have reinforced PTFE Seats, Blow-out Proof Stem, Full Port Ball, Chrome/Nickel Plated or Stainless Steel Ball for aggressive water.

b. 2 Inch and Smaller Check Valves (Swing Type):

Check valves shall be swing type Y pattern with male or female press to connect ends and shall be rated 200 PSI CWP to + 250°F maximum. Valves shall be manufactured in accordance with MSS SP-80. Body & cap shall be manufactured of dezincification resistant cast bronze ASTM B62 or ASTM B584 Alloy C8440. Valves shall have PTFE seat disc.

c. 2 Inch and Smaller Check Valves (Lift or Spring Type):

Incline resilient disc, spring actuated, 250psi rating, non-shock cold working pressure, 2500F maximum working temperature, bronze ASTM B584 alloy C84400. Stainless steel stem and disc holder and spring, EDPM O-ring.

H. Insofar as possible, all valves of the same type shall be of the same manufacturer.

I. Valve Manufacturers: Subject to compliance with requirements, provide valves of one of the following:

Apollo/Conbraco
Stockham
Nibco
Milwaukee
Watts
Hammond
Webstone

J. System Application:

1. Domestic Water:

a. Check Valves - 2" & Smaller - threaded or soldered.
b. Ball Valves - 3" & Smaller - threaded or soldered.
c. Balance Valves - All sizes - threaded.
d. Butterfly Valves - 4" and larger - flanged.
e. Butterfly Valves – 3” and smaller – wafer type.

2.6 THERMOMETERS

A. Separable socket, inserted into fluid flow, adjustable, hermetically sealed, red mercury, die-cast, baked enamel finish, double strength glass lens, white scale and black graduations.

B. Scale: Select range of thermometer to indicate normal operating temperature at mid-point of scale for domestic water systems.

C. Manufacturer: U.S. Gauge, H.O. Trerice, Moeller, Duro.

2.7 GAUGES

A. Phosphor bronze bourdon tube, polypropylene case, gasketed glass crystal, aluminum dial, black graduations 4-1/2 inch diameter.

B. Range: 0 to 150 psi, 5 pound intervals, 1/2 pound graduations.

C. Manufacturers: Danton, U.S. Gauge, H.O. Trerice, Moeller.

D. Install with bronze gauge cock.

2.8 ISOLATING FITTINGS

A. Furnish isolating fittings between all sections of dissimilar piping materials or piping, general supports, equipment and supports, including piping hanger and rack supports where one material is ferrous and the other is non-ferrous.

B. Install copper or brass piping or tubing in such a way as not to touch or come in contact with ferrous metals.

C. Where ferrous piping or equipment is connected to copper or brass piping, make connection with insulating or dielectric unions to prevent electrolytic action between the ferrous and non-ferrous metals.

D. Where copper or brass piping, tubing or fittings are anchored to, supported by or may come in contact with ferrous metal construction, provide an insulating nonconductor spacer of rubber, fiber or equivalent material to assure prevention of electrolysis.

E. Manufacturer: Epco Sales, Inc., or insulated unions by Central Plastic Co.

2.9 ANCHORS AND GUIDES

A. Anchors and guides shall be provided to support and maintain pipes in position and properly distribute expansion. The anchors and guides must be securely fastened to the building structure, and must be completely installed before the system is tested.

B. Guides shall be as manufactured by J.J. McNally, Inc., Flexonics, Inc., Tube-Turns, American District Steam Co.

2.10 UNIONS

A. Up to and including 2 inch pipe size: Screwed pattern, bronze-to- bronze seat.

B. Above 2 inch pipe size: 125 Class Flanged pattern, A.S.A. sweat copper fitting, with gaskets, bolts and nuts.

C. Copper tubing unions shall have sweated type ends. Flanged unions on copper tubing may be soldered connections.

D. Materials and pressure ratings shall be the same as specified for the respective pipe and fitting system unless otherwise specified.

PART 3 – EXECUTION

3.1 PIPING SYSTEM INSTALLATION REQUIREMENTS

A. Drawings are generally diagrammatic and due to small scale, it is impossible to indicate all fittings, valves, gauges and specialties required. Provide complete operating systems and all necessary fittings, valves gauges and specialties whether or not indicated.

B. Install all piping in accordance with the best practices of the trade and latest code requirements. Use uniform system materials throughout the building. All branch take-offs shall be off the top of the pipe.

C. Pipe and fittings shall be clean from cutting burrs, foreign materials and defects in structure and threading. Make all cuts square. Ream after cutting. Clean off scale and dirt inside and outside, before assembly. Remove welding slag or other foreign material.

D. Keep all piping as high as possible, consistent with proper pitch, to maintain maximum headroom. Cut piping accurately to measurements established at the building, work into place without springing, forcing or cutting of the building structure, and install as directly as possible between connecting points parallel with or at right angles to building construction, except as required to obtain pitch.

E. Unless otherwise shown, run piping within the building, concealed in the walls, furred spaces, pipe spaces or above suspended ceilings. Unless otherwise noted, do not build in or bury horizontal piping in partitions. Install all exposed piping as closely as possible to walls, ceilings and columns, consistent with access and applicable insulation requirements.

F. This project includes a return air plenum ceiling. Regardless of materials specified, all system piping and/or materials shall be non-combustible and shall be in full compliance with the requirements set forth in the IPC.

G. All piping to drain to low points. Low points will be provided with drain valves with hose thread. All piping shall have high points vented with ball valve, nipple and threaded cap.

H. Do not install trapped lines where water cannot be drained or air can accumulate without being vented.

I. Piping shall run square with building lines.

J. Piping shall not be insulated or covered until tested and until building is closed in.

K. Necessary drains, off-sets, vents and drips shall be provided for coordination of the work as part of the contract.

L. Piping shall not be installed over electrical transformers, panels, switchgear, substations, and control panels as per the National Electric Code. No piping shall be installed in elevator machine rooms unless it is directly related to the room's system equipment.

M. Allow clearance for expansion and contraction.

N. Install isolating fittings between sections of ferrous and non- ferrous pipe or connected equipment.

O. Valves shall be installed with stems above horizontal.

P. Valves shall be installed on all sides of equipment and control valves to allow isolation for repair.

Q. Do not support piping from other piping, conduits or equipment. Provide additional bracing to prevent movement of trapeze piping, or any singular run of pipe to fixtures. Provide additional bracing on all piping through walls to flush valves to prevent movement during normal operation or performing maintenance on valves.

R. Thermometers and gauges shall be installed where indicated on the drawings, required by equipment specifications and where indicated elsewhere in the specifications. Gauges shall be located at an elevation that can be readable.

S. Unions shall be provided adjacent to all valves, at equipment connections, and where necessary to facilitate dismantling of the piping system.

T. Ball valves to be installed with the proper clearance for operating the valve handle. A minimum clearance of 10" from center of valve to wall must be maintained for ease of operation.

U. Thermometers are to be located so they can easily be seen from the floor in front of unit. Make final adjustment by tilting thermometer. Locate bulb in waterway with an oversized tee or elbow fitting.

V. Install pressure gauges on incoming services both domestic water and fire services. Locate pressure gauge after main shut-off valve and ahead of water meter if one is provided within building.

W. All pipe unions installed shall be accessible. Unions shall not be concealed or located in places where they cannot be maintained.

X. Support and bracing of 4” and above pipe shall be in accordance with the CISPI Standards and IPC Chapter 3.

3.2 TAGS, CHARTS, AND IDENTIFICATION

A. All piping shall be labeled in accordance with IPC 303.1 and 303.4.

B. Identify each valve in all systems with black, numbered and stamped 1-1/2" brass or aluminum tags fastened to valve by brass chain and S-hook.

C. Piping Identification: Provide identification and safety products, semi-rigid plastic, wraparound pipe markers with flow arrows and conforming to ANSI A13.1. Locate marker at each valve, changes in direction, where pipes pass thru barriers and every 25' of horizontal runs. Lettering on background shall be in accordance with the following colors:

Legend	Background	Lettering
1. Gas	- Yellow	- Black
2. Fire Protection	- Red	- White
3. Domestic Cold Water	- Green	- White
4. Domestic Hot Water (110° ^ 140°)	- Yellow	- Black
5. Domestic Hot Water Return (110° ^ 140°)	- Yellow	- Black
6. Sanitary Drainage	- Green	- White

7. Condensate Drainage	- Yellow	- Black
8. Vent	- Yellow	- Black
9. Storm Drainage	- Green	- White

D. Provide 1/8" scale diagrams showing location, number and service or function of each tagged item.

1. Frame diagrams in approved metal frames with clear acrylic front, hinges, and locks.
2. Secure to wall in Mechanical Room.
3. Provide two additional separate copies permanently covered and bound.

E. Furnish and install color coded 1" diameter markers on ceiling tile grids to indicate system and valve locations.

1. Domestic cold water: - Green
2. Domestic hot water: - Yellow
3. Domestic hot water return: - Yellow
4. Gas - Yellow

F. Available Manufacturers: Subject to compliance with requirements, manufacturer's offering identification markers which may be incorporated in the work are limited to the following:

Seton
Brimar
B-Line
Marking Services, Inc.

3.3 SOLDERING/BRAZING

A. Connections between copper tubing and copper sweat fittings shall be made by soldering using Taramet Sterling or approved substitute. Flux shall be non-corrosive type "Nokorode" or approved substitute or as recommended by the manufacturer of the solder.

B. All solder shall be "lead nickel and antimony free" in accordance with the Federal Safe Drinking Water Act Amendments of 1986 and 1996 as is ASTM B-32 Grade TC.

Composition:

Tin	95%
Copper	4.0 – 5.0%
Selenium	.04 - .2%
Tensile Strength	7,130 psi
Shear Strength	5,970 psi
Melting temperature	410°F

C. Tubing shall be cut square and then reamed and deburred. End of tubing and inside of fitting cup shall be cleaned with steel wool and the flux shall be applied to the clean surface before soldering. After soldering, the excess solder shall be wiped off while still plastic.

D. 410 solder shall be used for all joints in:

1. Domestic cold water
2. Domestic hot water
3. Domestic hot water return
4. Copper drainage piping

E. Lead-Tin (50-50) solder or any solder containing lead shall NOT be used or permitted for joint connections on this project.

F. Form continuous solder bead or brazing filler bead around entire circumference of joint.

G. Wipe excess solder from joint area while solder is still plastic.

H. Solder joints shall be in accordance with IPC Section 605.2, 605.14.3 and ASTM B838. Flux shall conform to ASTM B-813.

3.4 PRESS-FIT SYSTEM

A. All new domestic water piping installed on this project shall be a solderless, press-fit, domestic water system. The system shall be Viega/Rigid copper press fitting system. Fittings shall be rated 0□ to 250□ at 200 psi and tested to 600 psi.

B. Fittings shall meet ANSI/NSF 61, – ASME B-16.22 and ASTM B88. Elastomeric seals shall meet ASTM D-2000.

C. Mechanical joining shall be recognized by:

IPC International Plumbing Code
SBCCI Standard Plumbing Code
IAPMO Uniform Plumbing Code
PHCC National Standard Plumbing Code

D. Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press end shall have SC (Smart Connect) feature design (leakage path). Smart Connect™ (SC Feature). In ProPress ½" to 4" dimensions, the Smart Connect Feature assures leakage of liquids and/or gases from inside the system past the sealing element of an unpressed connection. This feature shall provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

E. Press Connections: Copper press fitting joints shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

F. Installer shall be a qualified installer, licensed within the jurisdiction, and familiar with the installation of ProPress copper press joint systems. ProPress copper press fittings shall be installed using the proper tool, actuator, jaws and rings as instructed by the press fitting manufacturer. The installation of copper tubing for hot and cold water distribution systems shall conform to the requirements of the ICC International Plumbing Code or IAPMO Uniform Plumbing Code.

G. Note: Viega Press-fit installation shall only be permitted on this project. Push-on shark-teeth, or any type connection fittings that are not Press-Fit, shall NOT be approved.

H. T-drill mechanically formed tee fittings shall be used in conjunction with the ProPress Copper System in accordance with the IPC Chapter 6 Section 605.5.1, 605.5.1.2 and 605.14.1. Use caution around combustible material and follow all safety guidelines for open flame during silver brazing.

END OF SECTION 22 00 10

SECTION 22 00 30

INSULATION & COVERING – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 DESCRIPTION OF WORK

A. This section includes insulation and covering furnished and installed on the following piping systems and equipment:

1. Domestic cold water.

2. Domestic hot water supply and return

3. "Primary" Horizontal rainwater conductors including underside of roof drains. "Secondary" rainwater systems insulation is not required.

4. Condensate waste piping from air conditioning units.

5. Exposed waste, trap and wall supplies at all handicap lavatories.

6. Branch waste lines from all chilled water fountains.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

B. Materials shall conform to the requirements of the NFPA Code.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Product data on all insulation and covering.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 PIPE INSULATION MATERIAL

A. Closed Cell:

1. Material: Flexible elastomeric foamed plastic closed cell structure insulation 25/50 rated with a flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2. Flexible pipe insulation shall be a foamed plastic closed cell structure material, with a thermal conductivity of not more than 0.27 Btu/Hr./Sq. Ft./Inch at a mean temperature of 75 degrees F. The insulation shall have an average density of at least 2 pounds per cubic foot, shall be self-extinguishing, and shall have a water vapor transmission rating of not more than 0.1 perms. Between temperature limits of -40 degrees F and plus 220 degrees F, the insulation shall not indicate any deviation from its original state.

3. Manufacturers: Armacel, Insul-Tube, Nomaco Insulation.

4. Specification Compliance: (Latest accepted Standards and Codes)

IECC 804.5:	Insulation thickness for domestic hot and recirculation mains.
ASTM-E-84	Flame spread and smoke developed.
NFPA 255:	Standard method of test of surface burning of building materials.
ASTM C177:	Thermal conductivity.
NFPA 90A, 90B:	Flame & smoke rating
ASTM-C-534 Type	1 Tubular Grade, Self-Sealing
UL 181	Factory made air ducts and air connectors. (Armacell UL181 has to do with mold growth)
UL723	Test for surface burning characteristics of building materials.
ASTM G21/C1338:	Fungi resistance
ASTM G2:	Bacterial Resistance
ASTM D1056, 2B1:	Standard spec for flexible cellular materials.
MIL-P-15280J, FORMT	
MIL-C-3133B (MIL STD 670B) Grade SBE-3	
MEA 96-85M	

C. Covering of Pipe Insulation Outdoors:

1. Wrapping: Wrap insulation with embossed .016" aluminum jacket.
2. Fastenings: Cover shall be held in place with soft aluminum bands on 12" centers.
3. Valves and Fittings: Weatherproof all valves and fittings.
4. Manufacturers: Johns-Manville, Certain-Teed, Owens-Corning, Knauf.

D. Protective cover for foam insulation in wet areas indoors:

1. PVC heavy duty fitting covers and jacketing for kitchen wet areas.
2. Fitting covers shall be glossy white, high impact, UV resistant PVC.
3. Operating Temperature Limit: Up to 150ºF.
4. Flame Spread: 25 or less.
5. Smoke Developed: 50 or less.
6. Grade: Weatherable.
7. Color: White
8. Finish: Gloss
9. Fitting covers and jacketing shall be "Zeston" 300 Series PVC, heavy duty covers and "Zeston" PVC jacketing.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Do not install until systems have been tested and meet requirements.

B. Heavy work which may damage insulation shall have been completed in the vicinity of the insulation work.

C. All installations shall be made by skilled craftsmen regularly engaged in this type of work.

D. Insulation shall be continuous thru-wall, ceiling and floors.

E. Pipe and equipment to be clean and dry prior to insulating.

F. Install all insulation in strict conformance with manufacturer's instructions.

G. Where "Barrier-free" lavatory supplies and waste are covered with a protective covering or insulation, the insulation must be installed back to wall, flush with wall escutcheon. Escutcheon to be finished flush with wall and wall opening to be smaller than escutcheon plate through entire building.

H. Install pipe insulation by slitting tubular sections and applying onto piping or tubing. Alternately, whenever possible, slide unslit sections over the open ends of piping or tubing. All seams and butt joints shall be adhered and sealed using Armaflex 520 or 520 BLV Adhesive. If when using AP Armaflex SS, only the butt joints shall be adhered using Armaflex 520 or 520 BLV Adhesive, Armaflex HT 625 Adhesive shall be used with HT Armaflex.

I. Insulation shall be pushed onto the pipe, never pulled. Stretching of insulation may result in open seams and joints.

J. Tape the ends of the copper tubing before slipping the Armaflex insulation over the new pipes to prevent dust from entering the pipe.

K. All edges shall be clean cut. Rough or jagged edges of the insulation shall not be permitted. Proper tools such as sharp, non-serrated knives must be used.

L. On cold piping, insulation shall be adhered directly to the piping at the high end of the run using a two-inch strip of Armaflex 520 or 520 BLV Adhesive on the ID of the insulation and on the pipe. All exposed end cuts of the insulation shall be coated with Armaflex 520 or 520 BLV Adhesive. All penetrations through the insulation and termination points must be adhered to the substrate to prevent condensation migration.

M. Sheet insulation shall be used on all pipes larger than 6" IPS. Insulation shall not be stretched around the pipe. On pipes larger than 12" IPS, adhere insulation directly to the pipe on the lower 1/3 of the pipe.

N. Seams shall be staggered when applying multiple layers of insulation.

3.2 VALVES, FLANGES AND FITTINGS:

A. All fittings shall be insulated with the same insulation thickness as the adjacent piping. All seams and mitered joints shall be adhered with Armaflex 520 or 520 BLV Adhesive. Screwed fittings shall be sleeved and adhered with a minimum 1" overlap onto the adjacent insulation. Armaflex HT 625 Adhesive shall be used with HT Armaflex.

B. Valves, flanges, strainers and Victaulic couplings shall be insulated using Armaflex donuts that shall then be covered with sheet or oversized tubular insulation.

3.3 HANGERS

A. Support piping system using high density inserts with sufficient compressive strength. The pipe support insulation shall be elastomeric foam with the same or greater thickness than the pipe insulation. All joints shall be sealed with Armaflex 520 or 520 BLV adhesive.

B. Standard and split hangers: Piping supported by ring hangers shall have hangers insulated with the same insulation thickness as the adjacent pipe. All seams and butt joints shall be sealed with Armaflex 520 or 520 BLV Adhesive. Armaflex HT 625 Adhesive shall be used with HT Armaflex. Ring hangers may be sleeved using oversized tubular insulation. On cold piping, insulation shall extend up the hanger rod a distance equal to four times the insulation thickness. Insulation tape may be used to a thickness equal to the adjacent insulation thickness.

C. Clevis Hangers or other pipe support systems: Saddles shall be installed under all insulated lines at unistrut clamps, clevis hangers or locations where the insulation may be compressed due to the weight of the pipe. All piping shall have wooden dowels or blocks of a thickness equal to the insulation inserted and adhered to the insulation between the pipe and the saddle.

It is highly recommended for continuous insulation protection to use hanger sizes equal to the outer diameter of the pipe plus insulation thickness

D. Armafix IPH o Armafix NPH can be used to prevent compression of insulation at standard split, clevis hangers or other pipe support systems. To minimize the movement of Armafix, it is recommended that a pair of non-skid pads be adhered to the clamps. In addition, to prevent loosening of the clamps, use of an antivibratory fastener, such as a nylon-locking nut, is also recommended.

3.4 PIPE COVERING (FOAMED PLASTIC TYPE)

A. All joints and seams shall be sealed with a compatible adhesive. Approved adhesives are as follows:

Armacel No. 520 (Low VOC use 520 BLV
Benjamin Foster Company No. 85-75 up to 200 degrees F.

Contractor may use self-sealing insulation in lieu of above.

B. Fitting covers shall be fabricated from the foamed plastic pipe insulation or from sheet insulation of the identical material. The fabrication shall be in accordance with manufacturer's instructions, and all seams mitered joints shall be joined using the adhesives described.

3.5 PIPE INSULATION – TYPES & THICKNESSES

A. Flexible Closed Cell:

Piping System	Up to 3"	Over 3" to 6"	Over 6"
Cold Water	½"	½"	¾"
Hot Water (120º)	1"	1"	1-1/2"
Hot Water Return (120º)	1"	1"	1-1/2"
Hot Water (140º)	1"	1"	1-1/2"
Hot Water Return (140º)	1"	1"	1-1/2"
Condensate Waste	½"	½"	-
Horizontal Storm (Primary)	½"	½"	¾"
Horizontal Storm (Secondary) -----Not Required-----			
Underside of Roof Drains	½"	½"	¾"
Branch Waste From EWC's	½"	---	---
Handicap Lav Waste & Water	½"	---	---
Soil/Waste Piping Above Ceiling	½"	½"	¾"

END OF SECTION 22 00 30

SECTION 22 01 10

DRAINAGE SYSTEMS – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. This section includes:

1. Soil and waste piping system work as indicated on drawings and schedules, and by requirements of this section.

2. Applications for soil and waste piping systems include the following:

   a. Above ground soil, waste and vent piping within buildings including soil stacks, vent stacks, horizontal branches, traps and connections to fixtures and drains.

   b. Underground building drain piping including mains, branches, traps, connections to fixtures and drains, and connections to stacks, extension from the building, terminating at connection to site sewer.

3. Storm water drainage piping as indicated on drawings and by requirements of this section.

4. Applications for storm water drainage piping include the following:

   a. Roof drains and connections to gutters, with rain water conductors and connections to underground building storm drains.

   b. Underground building storm drains, extending and connecting to site drainage system.

5. Insulation for soil and waste and storm water drainage as specified in Section 220030 is included as work of this section.

6. Trenching and backfilling required in conjunction with underground building drainage and site drainage piping as specified in Section 220000 is included as work of this section. Refer to Division I.

7. Installation of detectable metallic underground tape for <u>all</u> exterior buried PVC drainage piping.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section, and a listing of all applicable codes.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Product data on all systems equipment.

C. See requirements for submission of cross referencing information.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 PIPING UNDERGROUND

A. Interior:

1. Sanitary, storm water and condensate waste drainage piping within the building and extending beyond the building wall, unless otherwise noted on the plans shall be an option selection of a, b, or c below:

   a. Service weight hub and spigot pattern cast iron soil pipe and fittings with neoprene gaskets.

   b. Hubless cast iron soil pipe and fittings with cast iron coupling clamps and gaskets or heavy duty 3.04-.016" thick stainless steel bands..

   c. PVC Schedule 40 pipe and fittings with solvent cement joints.

2.2 PIPING ABOVE GROUND (PLENUM RATED CEILING)

A. All above ground storm water, condensate, soil, waste and vent piping shall be:

1. Hubless cast iron soil pipe with cast iron drainage fittings, couplings and stainless steel clamp bands for piping 2" and larger.

2. Copper tubing, type DWV with wrought copper solder type drainage fitting for piping smaller than 2" in size.

2.3 CONDENSATE WASTE PIPING SYSTEM

A. All aboveground condensate waste piping including connection to equipment shall be:

1. PVC pipe and fittings type DWV with solvent cement joint connections.
2. Copper tubing, type DWV with wrought copper solder type drainage fittings.

2.4 FLASHING

A. All vents extending through the roof shall be flashed by the General Contractor. However, the Plumbing Contractor shall furnish and install the necessary counterflashing consisting of a Jay R. Smith Figure 1748 counterflashing fitting, or approved substitute as manufactured by Josam or Zurn. Vents shall terminate 18" above the roof.

2.5 SYSTEMS EQUIPMENT

A. Refer to Plumbing Fixture and Equipment Schedule for type, number, size and manufacturer of all drainage equipment and accessories.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering drainage equipment which may be incorporated in the work are limited to the following:

<u>Floor Drains (all types)</u>

Zurn
Josam
Wade
Watts
Smith
MIFAB

<u>Cleanouts</u>

Zurn
Josam
Wade
Watts
Smith
MIFAB

C. Cross Reference Identification:

1. If the Contractor selects a manufacturer of drainage equipment products other than as identified on the Schedule but is selected from the available manufacturers listed above, a cover sheet shall be included with the submission of shop drawings indicating the cross referenced manufacturer and model number.

2. Shop drawings shall not be reviewed or accepted if not in compliance with this requirement.

PART 3 – EXECUTION

3.1 INSTALLATION OF SOIL AND WASTE PIPING

A. The Plumbing Contractor shall install a complete system of sanitary drainage piping as shown on the drawings. All drainage lines shall be properly run, trapped and vented in accordance with the local Plumbing Code and all dry vents, back vents, loop vents, revents or special vents required by the Code shall be furnished and installed by the Plumbing Contractor.

B. Drainage lines of the sizes shown on the drawings shall be extended within the building with branches connecting to the base of all soil, waste and vent stack, etc., leaving outlets for connection to all fixtures, floor drains, as required.

C. All changes in direction of drainage piping shall be installed with "Y" branches and 1/8 bends. All stacks shall be supported with concealed pipe clamps or hangers as required and the openings in the roof for the vent pipes will be provided by this Contractor.

D. All drainage piping which will be located above suspended ceilings shall be checked for slope to assure positive drainage, prior to installation of the ceilings. Pressure tests for leaks, as hereinafter specified, shall also be performed prior to ceiling installation.

E. Install soil and vent piping pitched to drain at minimum slope of 1/4" per foot (2%) for piping 3" and smaller, and 1/8" per foot (1%) for piping 4" and larger.

F. Vertical to horizontal change in direction to be made with long radius fittings.

G. Support all soil and waste piping per IPC Section 308.5, 308.6 and 308.7.

3.2 INSTALLATION OF STORM WATER DRAINAGE PIPING

A. All changes in direction of drainage piping shall be installed with "Y" branches and 1/8 bends. All stacks shall be supported with concealed pipe clamps or hangers as required, and the openings in the roof for the vent pipes will be provided by this Contractor.

B. All drainage piping which will be located above suspended ceilings shall be checked for slope to assure positive drainage, prior to installation of the ceilings. Pressure tests for leaks, as hereinafter specified, shall also be performed prior to ceiling installation.

C. Install storm water drainage piping pitched to drain at minimum slope of 1/8" per foot (1%) for piping 4" and larger.

D. Vertical to horizontal change in direction to be made with long radius fittings.

3.3 INSTALLATION OF CLEANOUTS

A. Cleanouts: Install in sanitary piping and storm conductor and building drain piping as indicated, and/or as required by International Plumbing Code; at each change in direction of piping greater than 45 degrees; at minimum intervals of 100' for all size straight run piping; and at base of each conductor. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish.

3.4 INSTALLATION OF FLOOR DRAINS (ALL TYPES)

A. Install floor drains in accordance with manufacturer's written instructions and in locations indicated.

B. Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.

C. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.

D. Position drains so that they are accessible and easy to maintain.

E. All floor drains shall be provided with trap primer connections. All floor drains shall have a trap primer discharge line connected to the outlet.

F. All exposed drainage piping shall be DWV copper pipe and fittings. All piping shall be rigidly supported off the wall with split ring clamps or uni-strut.

3.5 INVERTS AND ELEVATIONS

A. Indicated inverts and elevations of existing utilities are approximate and based on the best information available. Upon award of Contract, Contractor shall verify in the field all such information and report any discrepancies to the Engineer before proceeding with work.

3.6 PIPING INSTALLED IN FILLED GROUND

A. Piping located below floor slab in filled areas shall be supported either from the floor slab, or with masonry piers to undisturbed earth. Drainage piping shall be supported at each joint. Exterior piping located in filled areas shall be supported with piers.

B. Details of supports and method of installation shall meet with the approval of the Engineer.

3.7 INSPECTION

A. The Plumbing Contractor shall, upon completion of the drainage systems, secure from the Inspector and/or the Municipality under which the installation was made and inspected, certificates or letters of approval indicating the system has been installed satisfactorily. The Plumbing Contractor shall certify that all inspection fees, permits and charges have been duly paid.

END OF SECTION 22 01 10

SECTION 22 01 20

DOMESTIC WATER SYSTEMS – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. This Section includes:

1. Domestic water piping systems work is indicated on drawings and schedules and by requirements of this section.

B. Applications for water piping systems include the following:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Domestic recirculating-water piping.

C. Insulation for domestic water piping as specified in Section 220030 is included as work of this section.

D. Trenching and backfill required in conjunction with exterior water piping as specified in Section 220000 is included as work of this section. Refer to Division 1.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Product data on all specialties and systems equipment.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 DOMESTIC WATER PIPING MATERIALS AND PRODUCTS

A. Provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in domestic water piping systems. Where more than 1 type of materials or products are indicated, selection is Installer's option.

2.2 BASIC PIPE, TUBE AND FITTINGS

A. Provide pipe, tube, and fittings complying with Division 22 Basic Materials and Methods section "Pipe, Tube, and Fittings", in accordance with the following listing:

B. Interior Domestic Water Piping:

Tube Size 4" and Smaller:	Copper tube.
Wall Thickness:	Type "L" hard-drawn temper.
Fittings:	Wrought-copper, solder-joints.

C. Exterior Water Service Piping:

Pipe Size 3" and Smaller:	Copper tube.
Wall Thickness:	Type "K" Soft Temper
Fittings:	Wrought copper solder joint.

2.3 BASIC PIPING SPECIALTIES

A. Provide piping specialties complying with Section 220010 Basic Materials and Methods in accordance with the following listing:

Pipe escutcheons
Dielectric unions
Drip pans
Pipe sleeves
Sleeve seals

2.4 SPECIAL PIPING SPECIALTIES

A. Water Hammer Arresters: Provide bellows or piston type water hammer arresters, pressure rated for 250 psi, tested and certified in accordance with PDI Standard WH-201.

2.5 BASIC VALVES

A. Provide valves complying with applicable Division 22 sections "Valves", in accordance with the following listing:

B. Sectional Valves:

2-1/2" and Smaller:	Ball Valves. Gate Valves.
3” and Larger:	Ball Valves. Butterfly Valves.

C. Shutoff Valves:

2-1/2" and Smaller:	Ball Valves. Gate Valves
3" and Larger:	Ball Valves. Butterfly Valves.

D. Drain Valves:

All	Hose End Threaded Gate or Ball Valves.

E. Balancing Valves:

2" and Smaller:	Ball Valves (Circuit Setter Type). (with Memory Stop)

F. Check Valves:

All Sizes:	Swing Check Valves. Horizontal Installations Spring Check Valves. Vertical Installations

2.6 SPECIAL VALVES

A. Special valves required for domestic water piping systems include the following types:

B. Hose Bibbs: Threaded end, renewable composition disc, tee handle, 3/4" NPT inlet, 3/4" hose outlet with vacuum breaker.

1. Finished Areas: Chrome plated.
2. Unfinished Areas: Bronze finish.

C. Wall Hydrants: Non-freeze, cast-bronze body, tee handle key, bronze casing, length to suit wall thickness, vacuum breaker, hinged locking cover, 3/4" inlet, hose outlet.

2.7 SYSTEMS EQUIPMENT MANUFACTURERS

A. Refer to Plumbing Fixture and Equipment Schedule for type, number, size and manufacturer of all equipment and accessories.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering equipment which may be incorporated in the work are limited to the following:

Shock Absorbers:
Zurn
Josam
Wade
Watts
Smith
PPP Inc.
MIFAB

Automatic Trap Primers
PPP Inc.
Sloan
Sioux Chief
MIFAB

Hose Bibbs
Nibco
Tanner
Central Brass
Wolverine

PART 3 – EXECUTION

3.1 INSTALLATION OF BASIC IDENTIFICATION

A. Install mechanical identification in accordance with Section 220010 Basic Materials and Methods.

B. Support vertical piping at floor levels using approved riser clamps. Clamp material shall be compatible with pipe material. Maximum vertical spacing shall be 10'-0". Domestic water piping shall be supported in accordance with the International Mechanical Code, Section 305 and Table 305.4 Spacing Intervals, or in accordance with MSS-SP-69. International Plumbing Code's latest edition, Section 308.5, accept as follows:

1. Copper tubing ½" to 1-1/4" nominal size, not to exceed 6 ft. horizontal intervals.
2. Copper tubing 1-1/2" and larger nominal size, not to exceed 10 ft. horizontal intervals.
3. Copper tubing ½" to 1-1/4" nominal size, not to exceed 10 ft. vertical intervals.
4. Copper tubing 1-1/2" and larger nominal size not to exceed 10 ft. vertical intervals.
5. CPVC pipe or tubing ¼" to 1" nominal size, not to exceed 3 ft. horizontal spacing.
6. CPVC pipe or tubing 1-1/4" and larger nominal size not to exceed 4 ft. horizontal spacing.
7. CPVC pipe or tubing ¼" to 1" nominal size not to exceed 10 ft. vertical.
8. CPVC pipe or tubing 1-1/4" and larger nominal size not to exceed 10 ft. vertical."
   *Mid-Story Guide.

3.2 INSTALLATION OF PIPING SPECIALTIES

A. Install piping specialties in accordance with Section 220010 Basic Materials and Methods.

B. Water Hammer Arresters: Install in upright position, in locations and of sizes in accordance with PDI Standard WH-201, and elsewhere as indicated.

3.3 INSTALLATION OF VALVES

A. Install valves in accordance with Division 22 Basic Materials and Methods section, "Valves".

B. Sectional Valves: Install on each branch and riser, close to main, where branch or riser serves 2 or more fixtures, equipment connections, and elsewhere as indicated.

C. Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.

D. Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain domestic water piping system.

E. Check Valves: Install on discharge side of each pump, and elsewhere as indicated.

F. Balance Cocks: Install in main recirculating loop and in each branch hot water recirculating loop. Install a ball valve and check valve at each balance valve installation.

G. Hose Bibbs: Install on exposed piping where indicated, with vacuum breaker.

3.4 EQUIPMENT CONNECTIONS

A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by International Plumbing Code.

B. Equipment furnished by the Owner or Contractors other than this Contractor: After equipment has been set in place, this Contractor shall furnish all labor and material required to make final connections, between roughing-in and the equipment. Install valves, fittings, trim and appurtenances furnished with the equipment. All exposed piping in the kitchen areas shall be chrome plated. Piping in other areas shall be of the same material as the system to which it connects.

3.5 AUTOMATIC TRAP PRIMERS

A. Install units in accordance with manufacturer's written instructions.

B. Cap-off all unused tube connections not to be used for discharge procedures.

C. Units installed in Mechanical Room shall be surface mounted. All others shall be arranged for recessed installation and shall include a 14"x16" access door #D-1416SS.

D. All discharge tubing from the tube connectors to the floor drain connection shall be minimum Type "M" copper for above floor slab installations. Where discharge piping runs below the floor slab, the piping may be PVC grade water piping. Ensure that all connections are properly made and leak-free.

E. Verify all electrical connections prior to the start-up of the units.

F. Shield copper from direct contact with concrete, stone and sharp edges below slab.

3.6 SPARE PARTS

A. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bibb, or faucet installed.

3.7 DOMESTIC HOT WATER RETURN

A. This Contractor shall install complete and operating hot water return system. The system shall be balanced and include a report as required in HVAC Specification Section 230950.

B. Balancing Valves are required in the system as hereinbefore specified. The system shall also include the installation of “air bleed” or “burp” valves to remove any trapped air in the system.

END OF SECTION 22 01 20

SECTION 22 01 30

GAS PIPING SYSTEMS – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. Refer to Section 220005 for a general description of the scope of work in this contract.

B. This Section includes:

1. Natural gas piping system as indicated on drawings and schedules, and by requirements of this section.

2. 0.2 Psi from gas header in Mechanical Boiler Room.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this Section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Product data on gas valves.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 NATURAL GAS PIPING MATERIALS AND PRODUCTS

A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with ANSI B31.2 where applicable, base pressure rating on natural gas piping system maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match piping materials used in natural gas piping systems. Where more than 1 type of material or product is indicated, selection is Installer's option.

2.2 BASIC IDENTIFICATION

A. Provide identification complying with Division 22 Sections and in accordance with the following listing:

Building Distribution Piping: Plastic pipe markers.
Gas Service: Underground type plastic line markers with detectable wire..
Gas Valves: Plastic valve tags.

2.3 BASIC PIPE, TUBE AND FITTINGS

A. Provide pipe, tube and fittings complying with Section 220010 Basic Materials and Methods - Plumbing and in accordance with the following listing:

1. Interior Piping: Schedule 40 black steel ASTM A-53, A-106

   Fittings: Malleable galvanized iron, threaded (WILM)

2. Exterior Exposed or Roof Top Piping: Schedule 40 black steel with weather coating.

   Fittings: Wrought steel, butt welded.

2.4 BASIC PIPING SPECIALTIES

A. Provide piping specialties complying with applicable Division 22 Sections and in accordance with the following listing:

Pipe escutcheons
Pipe sleeves
Sleeve seals

2.5 SPECIAL VALVES

A. Valves required for gas piping systems on this project shall be the following types:

Gas Valves: (Up to 3”)

1. Apollo 80-100 Series bronze gas ball valve. Threaded, 600 PSIG WOG, cold non-shock. 250 PSIG LP-Gas. 150 PSIG saturated steam. Vacuum service to 29 inches Hg. Federal Specification: WW-V-35C, Type: II, Composition: BZ, Style: 3.

2. Features:

   - UL Listed for LP-Gas and natural gas.
   - Large ports to reduce pressure drop
   - Reinforced TFE seats and seals
   - Blow-out-proof stem design
   - Optional tee handle available
   - Quarter turn on-off
   - Adjustable packing gland
   - One piece bronze body
   - Chromium plated ball

3. UL Listings:

   - Guide YSDT: LP-Gas shut-off valve.
   - Guide YRPV: Gas shut-off valve for use with natural and manufactured gases.

4. This valve shall be used for all pipe sizes up to 3” in the system.

<u>Gas Valves (4” and Larger)</u>

1. Apollo 88A-100 Series carbon steel, ANSI Class 150 flanged standard port ball valves.

   Standards of Compliance:
   IFGC: Section 409 (Valves)
   ASME B16.5 – Pipe Fittings and Flanges
   ASME B16.33 – Manual Operated Metal Gas Valves up to 125 psig
   ASME B16.38 – Large Metal Valve Gas Distribution
   ASME B31.8 – Gas Transmission and Distribution Piping Systems
   UL 125

B. Manufacturers: Subject to compliance with requirements, provide gas valves of one of the following:

   Apollo/Conbraco
   Stockham
   Milwaukee
   NIBCO, Inc.
   Watts

2.6 GAS METER

A. Provided by _____ Gas Division.

2.7 GAS PRESSURE REGULATORS

A. ANSI Z21.18, single-stage, steel-jacketed, corrosion-resistant pressure regulators. Include atmospheric vent, elevation compensator, with threaded ends conforming to ASME B1.20.1 for 2 inch NPS and smaller and flanged ends for 2-1/2" NPS and larger. Regulator pressure ratings, inlet and outlet pressures, and flow volume in cubic feet per hour of natural gas at specific gravity are as indicated.

1. Service Pressure Regulators: Inlet pressure rating not less than natural gas distribution system service pressure.

2. Line Gas Pressure Regulators: Inlet pressure rating not less than system pressure.

3. Appliance Gas Pressure Regulators: Inlet pressure rating not less than system pressure.

4. Gas Pressure Regulator Vents: Factory or field installed corrosion-resistant screen in opening when not connected to vent piping.

5. Regulators shall be as manufactured by Fisher (no equal substitute permitted).

PART 3 – EXECUTION

3.1 INSTALLATION OF BASIC IDENTIFICATION

A. Install mechanical identification in accordance with applicable Division 22 Sections.

3.2 INSTALLATION OF NATURAL GAS PIPING (INTERIOR)

A. Install natural gas distribution piping in accordance with Section 220010 Basic Materials and Methods - Plumbing and in accordance with applicable codes IFGC latest edition, and local Utility Company requirements.

B. Use sealants on metal gas piping threads which are chemically resistant to natural gas. Use sealants sparingly, and apply to only male threads of metal joints.

C. Remove cutting and threading burrs before assembling piping.

D. Do not install defective piping or fittings. Do not use pipe with threads which are chipped, stripped or damaged.

E. Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping or equipment connections are completed.

F. Install drip-legs in gas piping where indicated, and where required by code or regulation.

G. Install "Tee" fitting with bottom outlet plugged or capped at bottom of pipe risers.

H. Use dielectric unions where dissimilar metals are joined together.

I. Install piping with 1" drop in 60' pipe run (0.14%) in direction of flow.

J. Install piping parallel to other piping, but maintain minimum of 12" clearance between gas piping and steam or hot water piping above 200 degrees F (93 degrees C).

K. For piping buried in building substrate, or below floor slabs, install in welded conduit, ventilated to outdoors on both ends, and tested to same requirements as gas piping.

L. Gas valves shall not be installed above ceilings without access and signage.

M. Supports:

1. All pipe, fittings, valves, installation and testing shall be in accordance with the IFGC, Chapter 4.

2. Gas piping shall be supported in accordance with the International Fuel Gas Code's latest accepted 2003 Edition, Section 407, as follows:

3. Support intervals shall be in accordance with the IFGC listed above and in Section 415, Table 415.1 as follows:

   a. Steel pipe ½" nominal size – not to exceed 6 ft.
   b. Steel pipe ¾" to 1" nominal size – not to exceed 8 ft.
   c. Steel pipe 1-1/4" and larger nominal size horizontal – not to exceed 10 ft.
   d. Steel pipe 1-1/4" and larger nominal size, vertical not to exceed every floor.

4. Support and spacing of CSST Systems shall be in accordance with CSST manufacturer's instructions.

3.3 INSTALLATION OF VALVES

A. Gas valves: Provide at connection to gas train for each gas-fired equipment item; and on risers and branches where indicated.

B. Locate gas valves where easily accessible, and where protected from possible damage.

3.4 EQUIPMENT CONNECTIONS

A. Connect gas piping to each gas-fired equipment item, with drip leg, union and shutoff gas valve. Comply with equipment manufacturer's instructions. Drip legs shall **not** be installed on any exterior gas piping.

B. Equipment furnished by the Owner, or Contractors other than this Contractor: After equipment has been set in place, this Contractor shall furnish all labor and material required to make final connections between roughing-in and the equipment. Install valves, fittings, trim and appurtenances furnished with the equipment. Piping shall be of the same material as the system to which it connects.

C. All rooftop, gas-fired equipment shall be provided with gas pressure regulating valve to reduce gas pressure from 2 psi to 14" WC. All regulators shall be provided with relief vent discharge piping of lengths as required for minimum distance of equipment air intake grilles. Provide and install test connections in accordance with the IFGC.

3.5 INSTALLATION OF GAS PRESSURE REGULATORS

A. This Contractor shall furnish and install gas pressure regulating valves for all shown on the drawings. Installation shall be in strict accordance with the requirements of the Utility Company and the Canadian Gas Association.

B. All regulators installed shall be tagged with data noting the inlet and outlet pressure for each individual regulator installed.

C. Medium or High Pressure (MP) (HP) Regulators shall comply with the following:

1. The MP regulator shall be approved and shall be suitable for the inlet and outlet gas pressures for the application.

2. The MP regulator shall maintain a reduced outlet pressure under lockup (no flow) conditions.

3. The capacity of the MP regulator, determined by published ratings of its manufacturer, shall be adequate to supply the appliances served.

4. The MP pressure regulator shall be provided with access. Where located indoors, the regulator shall be vented to the outdoors or shall be equipped with a leak-limiting device, in either case complying with Section 410 of the IFGC.

5. A tee fitting with one opening capped or plugged shall be installed between the MP regulator and its upstream shutoff valve. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument and to serve as a sediment trap.

6. A tee fitting with one opening capped or plugged shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument.

3.6 EXTERIOR GAS PIPING

A. All rooftop or exterior gas piping shall be weatherproof with and epoxy resin approved by the Gas Company.

B. Uncoated, threaded or socket welded joints shall not be used in piping in contact with soil or where internal or external service corrosion is known to occur.

C. Protective Coatings and Wrapping: Pipe protective coatings and wrappings shall be approved for the application and shall be factory applied.

OR

A. All exterior gas pipe and fittings installed , including all welded joints, shall be provided with weatherproof coatings. The coatings shall be a two-layer PE "Pritec" coating as manufactured by Liberty Coating. The coatings shall be Butyl rubber adhesive with a polyethylene topcoat.

B. Component Properties:

Adhesive
Polyethylene

ADHESIVE		
Softening Point	ASTM E28	190°F
Water Absorption	ASTM D570	<0.1%
Adhesive		Compounded Butyl Rubber

POLYETHYLENE		
Color		Black
Density	ASTM D1505	>0.950
Elongation	ASTM D638	>600%
Tensile Strength	ASTM D638	>2,800 psi
Outdoor Exposure		>2 years
Hardness, Shore D	ASTM D2240	>60

PRITEC®		
Operating Temperature		-40°F to +180°F
*Peel Strength	ASTM D1000	>20 lbs lineal
Field Bending	Arctic Service Equipment	1.9 deg. per pipe dia.
Water Absorption	ASTM D570	0.06%
Impact Resistance	ASTM G14	33.65 in/lbs (10/40 sys.)
Volume Resistivity	ASTM D257	10x1016 Ohm cm
Dielectric Strength	ASTM D149 @73°F	700 Volts/Mil
Cathodic Disbondment	1.5v/3%/70°F/24 Hrs.	6 mm radiius

END OF SECTION 22 01 30

SECTION 22 01 40

FIXTURES – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 DESCRIPTION OF WORK

A. This Section includes:

1. Plumbing fixtures and trim work as indicated by drawings and schedules, and by requirements of this section.

2. Types of plumbing fixtures required for the project include the following:

   Water Closets
   Urinals
   Lavatories
   Countertop Sinks
   Manually Operated Flush Valves
   Handicap Lavatory Insulation
   Lavatory Shield Enclosure

3. Refer to Section 220120 for domestic water piping systems used in conjunction with plumbing fixtures; not work of this section.

4. Refer to Section 220110 for soil and waste piping systems used in conjunction with plumbing fixtures; not work of this section.

5. Refer to Division 26 sections for electrical connections to water coolers and other plumbing fixtures; not work of this section.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

B. Manufacturers: Firms regularly engaged in manufacture of plumbing fixtures of the type, style and configuration required, whose products have been in satisfactory use in similar service for not less than 3 years.

C. Plumbing Fixture Standards: Comply with applicable portions of International Plumbing Code pertaining to materials and installation of plumbing fixtures.

D. ANSI Standards: Comply with applicable ANSI standards pertaining to plumbing fixtures and systems.

E. ANSI & ADA Standards: Comply with ANSI A171.1 Standard and the ADA Standard pertaining to plumbing fixtures and provisions for handicapped.

1. Water closets shall be installed to heights indicated on the Architectural details. Bowls shall be elongated type.

2. Flush valve mechanisms shall be on the wide side of the stall, no higher than 44" above the floor.

3. Urinals shall be elongated (14" rim from the wall) See Architectural details for all elevations.

4. Lavatories shall be mounted no higher than allowed by Architect's details from the floor and provide knee clearance using an offset drain assembly with "P" trap set parallel to the fixture supporting wall. Trap and wall supplies shall be installed for clearance required for the installation of lavatory shield enclosures.

5. Faucets shall be lever operated, push type, touch type. See Fixture Schedule. All faucets shall operate on less than 5 pounds force and shall not require tight grasping, pinching or twisting of the wrist.

F. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.

G. Federal Standards: Comply with applicable FS WW-P-541/- Series sections pertaining to plumbing fixtures.

H. UL Labels: Provide water coolers which have been listed and labeled by Underwriters' Laboratories.

I. ARI Labels: Provide water coolers which are rated and certified in accordance with applicable Air-Conditioning and Refrigeration Institute Standards.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates, fixture carriers, and installation instructions.

2. Color Selection Data: Submit charts or samples for color selection where applicable.

3. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in maintenance manual.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.

B. Handle plumbing fixtures carefully to prevent breakage, chipping and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

PART 2 – PRODUCTS

2.1 PLUMBING FIXTURES

A. Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer and as required for a complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

2.2 MATERIALS

A. Unless otherwise specified, comply with applicable Federal Specification WW-P-541/-Series sections pertaining to plumbing fixtures, fittings, trim, metals and finishes. Comply with the requirements of WW-P-541/-specification relative to quality of ware, glazing, enamel, composition and finish of metals, air gaps, and vacuum breakers, even though some plumbing fixtures specified in this section are not described in WW-P-541/-.

B. Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, decoloration, or other surface imperfections on finished units are not acceptable.

C. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.

D. Stainless Steel Sheets: ANSI/ASTM A-167, Type 302/304, hardest workable temper. Finish: No. 4, bright, directional polish on exposed surfaces.

E. Steel Sheets for Baked Enamel Finish: ANSI/ASTM A-591, coating Class C, galvanized-bonderized.

F. Steel Sheets for Porcelain Enamel Finish: ANSI/ASTM A-424, commercial quality, Type 1.

G. Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes, and specks; glaze exposed surfaces, and test for crazing resistance in accordance with ANSI/ASTM C-554.

H. Fiberglass: ANSI Z124 smooth surfaced, with color selected by Architect/Engineer.

I. Aluminum: ANSI/ASTM B-209/B-221 sheet, plate and extrusions, as indicated; alloy, temper and finish as determined by manufacturer, except 0.40 mil natural anodized finish on exposed work unless another finish is indicated.

J. Synthetic Stone: High quality free from defects, glaze on exposed surfaces, stain resistant.

2.3 PLUMBING FITTINGS, TRIM AND ACCESSORIES

A. Lavatory Protective Shield Covers:

1. Fully molded enclosure “Lav Shields” as manufactured by Zurn or Truebro, Inc., complete with tamper-resistant stainless steel fasteners.

2. Shield enclosure to meet A.D.A. #4.19.4, ANSI A117.1 and BOCA P- 1203.4.

B. Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated. Include manual shutoff valves and connecting system pipes to permit outlet servicing without shut- down of water supply piping systems.

1. Vacuum Breakers: Provide with flush valves where required by governing regulations, including locations where water outlets are equipped for hose attachment.

C. P-traps: Include removable P-traps where drains are indicated for direct connection to drainage system. All traps shall be minimum 17 gauge.

D. Carriers: Provide cast-iron and/or steel supports for fixtures. Carriers shall be provided for all wall-hung fixtures, and/or the carrier shall be selected to support the fixture independently of the wall. Carriers shall be adjustable type, complete with all fittings and foot supports. Carrier shall be single or double, back-to-back, horizontal offset and vertical stack type. Carrier shall be selected and used as best suited within the pipe chases. Where noted or indicated, stud mount type carriers shall be used and installed within stud wall s 8” and less.

E. Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.

F. Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations, provide chrome plated sheet steel escutcheons with friction clips.

G. Aerators: Provide aerators of types approved by Health Departments having jurisdiction.

H. Comply with additional fixture requirements contained in fixture schedule attached to this section.

2.4 FIXTURE LIST

A. Refer to the "Plumbing Fixture & Equipment Schedule" as indicated on the drawings.

2.5 SENSOR-OPERATED LAVATORY SYSTEM FAUCETS (BRADLEY)

A. This Contractor shall furnish and install complete and operating sensor operational faucets where so indicated and noted. This shall include, but not be limited to, transformers and low voltage wiring.

B. Electrical power wiring shall be provided at the pipe chases and lavatory wash stations as required by the Electrical Contractor. See Electrical Plans. All wiring beyond that point shall be considered control wiring and shall be the complete responsibility of the Plumbing Contractor.

C. The Contractor shall have a complete understanding of the sensor operated equipment and system they are installing during the bid phase of the work. This includes all control wiring for the operation and function of the flush valves and faucets.

D. The Contractor shall install the system in strict conformance with the manufacturer's written instructions. The installation shall be executed with good workmanship and to be clear of any interference with the user including the installation of lavatory protective shield enclosures.

E. All faucet installations shall require a mixing valve for single water supply to faucet.

F. All sensor wall-mounted boxes and/or panels, including setting heights, shall be <u>strictly</u> coordinated with the masonry contractor for both drywall and block wall installations.

G. The Contractor shall coordinate the location of the electrical power junction box with Electrical Contractor including the installation of the transformer unit. The Plumbing Contractor shall provide an adequate sized access panel for maintenance and servicing of the transformer and junction box. The Contractor shall locate the junction box and transformer where best suited either above the ceiling or pipe chase wall.

2.6 AVAILABLE MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering fixtures, trim and carriers which may be incorporated in the work include, and are limited to the following:

<u>Water Closets (Wall-Mounted Back Outlet – China)</u>

Crane
American Standard
Sloan
Zurn

China/Enameled Fixtures

American Standard
Eljer
Crane
ToTo
Sloan
Zurn

Faucets/Trim (Non-Sensor Operated)

American Standard
Delta
Moen
Elkay
Speakman
Chicago
T&S Brass

Flush Valves

Sloan
Coyne & Delany
Zurn
ToTo
Delta

Wall Supplies/Traps

McGuire
Brass-Craft
Kohler
American Standard
Sanitary-Dash
Teledyne
Wolverine
Pro-Flo
Keeny

Fixture Carriers

Zurn
Josam
Wade
Watts
Smith
MIFAB

Fixture Seats

Olsonite
Sperzel
Benke
Bemis
Church
Kohler
American Standard
Centoco
Comfort Seat

B. Cross Reference Identification:

1. If the Contractor selects a manufacturer of drainage equipment products other than as identified on the Schedule but is selected from the available manufacturers listed above, a cover sheet shall be included with the submission of shop drawings indicating the cross referenced manufacturer and model number.

2. Shop drawings shall not be reviewed or accepted if not in compliance with this requirement.

2.8 HANDICAP LAVATORY INSULATION

A. Fully molded "P" trap and angle valve insulation kit Handi-Lav Guard Truebro Model #101, 102 and 105 to suit.

B. Insulation to meet A.D.A. #4.19.4, ANSI A117.1 and BOCA P- 1203.4.

C. Self-extinguishing ASTM D635 burn characteristics, Thermal conductivity ASTM C177-K value 1.17.

PART 3 – EXECUTION

3.1 FIXTURE CONNECTIONS

A. Connections to plumbing fixtures shall be of the sizes indicated on the "Plumbing Fixture & Equipment Schedule".

B. The sizes indicated on the Schedule are for drainage and water piping serving an individual fixture; the sizes of the mains and branches shall be as indicated on the drawings.

3.2 FIXTURE SETTING HEIGHTS

A. The plumbing fixtures shall be set in accordance with the heights established by the latest edition of codes and ADA requirements.

Note: Height indicated is established as follows:

Water Closets:	From finished floor to top of seat.
Urinals:	From finished floor to rim of fixture.
Lavatories & EWC:	From finished floor to rim of fixture.
Receptor Fitting:	From finished floor to center of fitting.
Shower:	From finished floor to center of shower head.

B. Refer to Architectural drawings and sections for fixture elevations. Fixtures in various areas may be set at lower elevations. Confirm all rough-in elevations prior to any installation.

3.3 LAVATORY PROTECTIVE SHIELD ENCLOSURES

A. Installation shall conform to manufacturer's written instructions.

B. All items involved with wall-hung lavatory installations shall be roughed-in and installed within the enclosure. This includes the offset "P" trap assembly, thermostatic mixing valve, sensor faucet trim and accessories, electrical outlet. Coordinate all work required for complete concealment of all devices.

C. Protective shield enclosures are required on the toilet room's countertop lavatories and are furnished by the Architect. Coordinate all trim and accessories to fit within this enclosure.

3.4 INSPECTION AND PREPARATION

A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until satisfactory conditions have been corrected.

B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and service intended purposes. Comply with applicable requirements of the International Plumbing Code pertaining to installation of plumbing fixtures.

C. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.

3.5 CLEAN AND PROTECT

A. Fixture shall be thoroughly cleaned after completion of installation.

B. Protect installed fixtures from damage during the remainder of the construction period.

3.6 FIELD QUALITY CONTROL

A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct

malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect/Engineer. Remove cracked or dented units and replace with new units.

END OF SECTION 22 01 40

SECTION 22 01 50

EQUIPMENT – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 DESCRIPTION OF WORK

A. This section includes:

1. Plumbing equipment as indicated on drawings and provisions of this section, including schedules and equipment lists associated with either drawings or this section.

2. Types of plumbing equipment required for project include the following:

   Elevator Sump Pump System

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

B. UL and NEMA Compliance: Provide electric motors and electrical components required as part of plumbing equipment, which have been listed and labeled by Underwriters' Laboratories and comply with NEMA Standards.

C. NEC Compliance: Comply with National Electrical Code (ANSI/NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.

D. ASME Relief Valve Stamps: Provide water heaters with safety relief valves bearing ASME valve markings.

E. AWWA Compliance: Comply with applicable American Water Works Association Standards pertaining to steel water tanks.

F. CSA and NSF Labels: Provide water tanks which have been listed and labeled by CSA International and National Sanitation Foundation.

G. ASME Code Symbol Stamps: For the following equipment, comply with ASME Boiler & Pressure Vessel Code for construction and stamp with ASME Code Symbol:

   Packaged Domestic Water Heater

H. All packaged equipment shall be independently third party, labeled as a system for its intended use by a nationally recognized testing laboratory (NRTL) in accordance with OSHA Federal Regulations 29CFR 1910.303 and .349 as well as NFPA Pamphlet #70 and NEC Article 90.7.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 220000.

B. Submit the following:

1. Product data on all equipment including roughing-in data.
2. Connection diagrams for related piping and specialties.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. Refer to "Plumbing Fixture & Equipment Schedule" for type, numbers, size and manufacturer of all equipment accessories.

2.2 ELEVATOR SUMP PUMP (COMPLIES W/DE STATE ELEVATOR CODE)

A. Provide pump and control systems capable of pumping water while containing oil. The system shall function automatically and shall provide for an alarm and separate LED lights in the event of (a) the presence of oil in the sump, (b) high liquid in the sump, or (c) high amps or a locked rotor condition. In addition, LED lights shall be provided for (1) power and (2) pump run function. An alarm that sounds only in the event of a high liquid condition or does not separately identify the above five functions shall not be acceptable.

B. The pump shall be a submersible type, capable of pumping up to 37' TDH and 74 GPM. The pump shall be approved to UL 778 standards and shall include thermal and overload protection. The motor shall be rated 1/2 H.P., 1 phase, 115V and capable of operating continuously or intermittently. The motor housing shall be constructed of #304 stainless steel and mechanical seats shall be housed in a separate oil-filled compartment.

C. The main control shall be approved to UL 508 standards and housed in a gasketed NEMA 4X enclosure with a see-through window for observation of operating functions. The control unit, junction box, pump, floats and sensor shall be factory assembled as a complete, ready-to-use system and shall be tested and approved as a complete system by a nationally recognized testing laboratory such as ENTELA. The control panel shall be equipped with dual solid state Oil-

Minder relays with variable sensitivity settings, an over current relay, self-cleaning stainless steel sensor probe, high decibel warning horn with alarm silencing switch, dual floats, clearly marked cable terminal board and remote monitoring contact. A NEMA 4X (sump pit) junction box with rigid conduit shall be provided. (Note: The control panel and the NEMA 4X (sump pit) junction box shall not be provided with 8-pin twist lock receptacles. All pump power and control cables between the control panel and NEMA 4x junction box shall be by the E.C. and shall have their length determined in the field. The cables between the control panel and junction box shall be connected directly to the equipment terminal boards and shall be run in ridge, galvanized conduit.) See installation detail on Plumbing Drawings. All cables between the pump and junction box shall be 16 ft. long and the power cable and plug from the control panel shall be 6 ft. long. The system shall allow for the main control to be located outside of the elevator hoistway and monitoring of all functions without having to enter the elevator shaft.

PART 3 – EXECUTION

3.1 AUTOMATIC TRAP PRIMER

A. The automatic trap primer units specified shall be recessed mounted and in the location indicated.

B. Installation shall conform to manufacturer's written instructions. The Electrical Contractor shall provide 120 volt electrical power and final connection.

C. The unit installation shall include a discharge line to each floor drain (F-8, F-9 and F-10) indicated and/or noted on the drawings. Any unused discharge line off the unit's discharge manifold shall be capped off within the panel.

D. All discharge lines shall be minimum "M" copper tube or flexible polyethylene tubing. All tubing shall be protected during below floor slab construction.

E. The unit shall be factory tested, assembled and prepiped and shall include a ¾" ball valve, shock absorber, vacuum breaker, copper distribution manifold, solenoid valve.

3.2 INSTALLATION OF ELEVATOR SUMP PUMP SYSTEM

A. Furnish and install all system equipment for a complete and operating installation. The equipment shall be installed as detailed on the drawing and in accordance with manufacturer's and equipment supplier's written instructions.

B. The pump and switch shall be installed within the elevator pit sump cavity. Install gate valve and check valve in pump discharge. Provide a cover grate atop the sump pit opening.

C. The installation shall include a high water alarm system and panel. Install floats within the sump pit. The alarm panel shall be a remote installation in the Elevator Machine Room where indicated on the drawing.

D. Electrical power wiring shall be provided to the panel by the Electrical Contractor, including control wiring and conduit to junction box in the sump pit. All wiring beyond that point shall be considered control wiring and shall be the responsibility of the pump installation contractor. Coordinate with the Electrical Contractor for all electrical connections required. All work

responsibilities shall be verified and executed for a complete operating and functional installation. Refer to drawing detail/diagram.

E. The Electrical Contractor shall provide a dedicated receptacle at the pump unit for system operation.

F. All pump equipment, piping, etc., shall be kept clear of all elevator cab operations and shall meet the approval of the elevator inspector.

END OF SECTION 22 01 50

SECTION 22 01 90

TESTING – PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. Extent of plumbing systems to be tested is indicated on the drawings and by requirements of this section.

B. Applications of tests include the following:

1. Interior Piping:
   a. Domestic cold, hot & hot water return piping
   b. Sanitary and condensate waste drainage piping
   c. Storm water drainage piping

C. See Fire Protection Specifications for testing of Fire Protection Systems.

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit test reports in accordance with Section 220000.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 PIPE & FITTING REPLACEMENTS

A. Refer to Section 220010 for replacement of any defective pipe or fittings. Replacement shall include all required uncovering, excavating, recovering and backfilling.

PART 3 – EXECUTION

3.1 GENERAL

A. All exterior or interior piping shall be tested and approved before backfilling or concealing. Failure to secure the approval of the Municipal Inspector, Utility Company's Inspector or the Inspector of the Architect/Engineer makes it mandatory for the Contractor to completely expose the piping for testing. All expense involved in the uncovering of the piping for the test and recovering shall be borne by the respective Contractor with no change in Contract.

B. All equipment, material and labor required for testing a plumbing system or part thereof shall be furnished by the Plumbing Contractor responsible for installing the work.

3.2 INTERIOR PIPING

A. Drainage Piping:

Rough Plumbing: The piping of all plumbing storm, condensate waste, sanitary drainage and venting systems shall be tested upon completion of the rough piping installation by water or air and proved watertight. Where required by the code official, the cleanout plugs shall be removed to ascertain if the pressure has reached all parts of the system. Either of the following methods shall be used:

1. Water Test: The water test shall be applied to the drainage system either in its entirety or in sections after rough piping has been installed. If applied to the entire system, all openings in the piping shall be closed, except the highest opening, and the system filled with water to the point of overflow. If the system is tested in sections, each opening shall be plugged except the highest opening of the section under test, and each section shall be filled with water, but a section shall not be tested with less than a 10-foot head of water.

   In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested, so that a joint or pipe in the building (except the uppermost 10 feet of the system) shall not have been subjected to a test of less than a 10-foot head of water. The water shall be kept in the system or in the portion under test for a minimum of 15 minutes before inspection starts. The system shall then be tight at all points.

2. Air Test: The air test shall be made by attaching an air compressor testing apparatus to an opening, and, after closing all other inlets and outlets to the system, forcing air into the system until there is a gauge pressure of 5 pounds per square inch (5 psi) or a minimum of 10-inch column of mercury. This pressure shall be held without introduction of additional air for a minimum period of 15 minutes.

   Precautionary Note: The compressibility of air and/or other gases result in tremendous amounts of stored energy, even at lower pressures. Over-pressurizing creates a substantial hazard to personnel and property near the area should a failure occur. Consult with the Plastic Pipe Institute (PPI) for statements and alerts, along with State and local safety offices.

Finished Plumbing: Where required by the code official, after the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gas and water-tight by one of the following test methods.

1. The final test for gas and water-tightness of the completed drainage and vent systems shall be made by a smoke test or other approved method. The test shall be made by filling all traps with water, and then introducing into the system smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1" water column shall be built and maintained for the period of the inspection.

2. After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proven gas and water-tight by plugging the stack openings on the roof and building drain where the drain leaves the building and with air introduced into the system equal to the pressure of a 1-inch water column. This shall be accomplished by the use of a "U" tube or manometer inserted in the trap of a water closet. Such pressure shall remain constant for the period of inspection without the introduction of additional air.

   Building sewer test: The building sewer shall be tested by insertion of a test plug at the point of connection with the public sewer or individual sewage disposal system. The building sewer shall then be filled with water under a head of not less than 10 feet. The water level at the top of the test head of water shall not drop for at least 15 minutes.

B. Domestic Water Piping: All new, altered, extended or replaced interior water piping installed shall be tested at 100 psig maintaining the pressure for four hours with not more than 1% drop in pressure. The system shall be filled with water which shall remain in the system until the water and the piping are the same temperature. If water pipe testing is under the jurisdiction of the local inspector, his requirements shall be used; however, they shall be not less than specified herein. The tests shall be performed in the presence of the representative of the Architect/Engineer and to his satisfaction.

3.3 STERILIZATION

A. After final testing for leaks, all new potable water piping installed including water service piping, shall be flushed to remove foreign material.

B. Before placing domestic water systems in service, a qualified service organization shall be engaged, to sterilize the entire building including the exterior water service piping in accordance with the following procedure:

1. Contractor shall provide a 3/4" hose connection somewhere in the main entering the building, or in the Mechanical Room and/or in the meter pit, pump in sufficient sodium hypochlorite to produce a free available chlorine residual of not less than 100 PPM.

2. Proceed upstream from the point of chlorine application opening all faucets and taps until chlorine is detected. Close faucets and taps when chlorine is evident. Consult with the local code department for additional concentrations and durations.

3. When chlorinated water has been brought to every faucet and tap with a minimum concentration of 200 PPM chlorine, retain this water in the system for at least three hours.

4. At the end of the retention period, no less than 100 PPM of chlorine shall be present at the extreme end of the system.

5. Proceed to open all faucets and taps and thoroughly flush all new lines until the chlorine residual in the water is less than 1.0 PPM.

6. Obtain representative water samples from the system for analysis by a recognized Bacteriological Laboratory.

7. If all samples tested for impurities and organisms are negative, a letter and laboratory reports shall be submitted by the service organization to the contractor, certifying successful completion of the sterilization.

8. If any samples tested indicate the presence of harmful impurities and organisms, the entire sterilization procedure shall be repeated.

9. Plumbing Contractor shall provide plumbing connections and power for pumping chlorine solution into the system.

   Warning: PVC and CPVC Pipe: Do not use a dry granular calcium hypochlorite as a disinfecting material for water purification in potable water piping systems. The introduction of granules or pellets of calcium hypochlorite with solvent cements and primers (including their vapors), may result in violent chemical reactions.

C. Available Service Organizations: Subject to compliance with requirements, provide the sterilization service of one of the following:

   Water Chem
   Arc Company, Inc.
   Nova Consultants
   Artesian Water Co.

END OF SECTION 22 01 90

SECTION 22 01 91

BALANCING - PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. Extent of plumbing systems to be balanced is indicated on the drawings and by requirements of this section.

B. Applications of tests include the following:

1. Interior Piping

a. Domestic hot water and hot water return

1.3 REFERENCE STANDARDS

A. Refer to Section 220000 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 220010 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit balancing report in accordance with Section 220000.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

PART 2 – PRODUCTS

2.1 PIPE & FITTING REPLACEMENTS

A. Refer to Section 220010 for replacement of any defective pipe or fittings. Replacement shall include all required draining of system, removal and replacement and uncovering, recovering.

PART 3 – EXECUTION

3.1 GENERAL

A. All new hot water return piping installed or wherever system valves are being replaced, the system shall be tested, balanced and approved before concealing. Failure to secure the approval of the Municipal Inspector, A/E Inspector or the Inspector of the Owner makes it mandatory for the Contractor to completely expose the piping for balancing. All expense involved in the uncovering of the piping for the balancing and recovering shall be borne by the respective Contractor with no change in Contract.

B. All equipment, material and labor required for balancing a plumbing system or part thereof shall be furnished by the Plumbing Contractor responsible for installing the work.

3.2 INTERIOR PIPING

A. Domestic Hot Water Return System: Upon completion of the testing of the domestic hot water supply and recirculation systems, a final procedure is to be performed to obtain uniform circulation within each hot water loop of the domestic hot water system. At the ends of the hot water mains, or wherever a branch return line connects to the main return line, there shall be three (3) valves: ball valve, check valve and balancing valve. These valves are to be installed in an accessible space at/or above the ceiling or where indicated on the drawings.

B. Based on an Accu-Flo balancing valve, the use of a differential pressure gauge Model No. 779 shall be used to achieve the greatest accuracy.

END OF SECTION 22 01 91

SECTION 23 02 00

GENERAL PROVISIONS – HVAC

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to work of this Section.

B. This specification or drawing and the design features or resulting construction disclosed, are the property of Furlow Associates, Inc., and shall not be reproduced without written permission.

C. All Mechanical Systems shall be part of and included in all of the following: 230200 thru 230950.

1.2 WORK INCLUDED

A. Provide labor, materials, equipment and supervision necessary to install complete operating HVAC Systems, including all work at the site and within the proposed construction areas to accomplish the required work.

B. Wherever the term "provide" is used, it shall be understood to mean both "furnish" and "install".

1.3 REGULATIONS, CODES AND STANDARDS

A. Work shall be performed in accordance with latest adopted codes, regulations and ordinances by authorities having jurisdiction. Observe all safety regulations.

B. Obtain all permits and inspection certificates and pay all charges.

C. Make or arrange for utility connections and pay all charges.

D. Latest editions of any referenced standards shall govern.

1.4 RELATED WORK

A. Refer to equipment shown or specified in sections of Division 1 thru 14 and 26 that will require Mechanical services and provide such service.

B. Refer to work related to HVAC as shown on the following contract drawings:

Architectural & Structural
Plumbing
Electrical

C. This Contractor shall coordinate with the work of Division 26 and the Fire Alarm System vendor for locations and mounting of all duct smoke detectors. These devices are shown on the Mechanical Drawings for reference only to show the intent of the work. All locations shall be determined based on approved shop drawings from the Fire Alarm System vendor and the Contractor for the work of Division 26, Electrical.

1.5 COORDINATION

A. The Mechanical, Plumbing and Electrical Contractors are responsible to coordinate all manufacturer's recommended circuit breakers, starters, disconnects and fuse sizes for all equipment. Submission of a shop drawing will certify that this has been completed. Any necessary changes required will be included as part of this contract.

B. Mechanical Contractor shall coordinate scheduling, submittals and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of independent work elements, with provisions to accommodate items that may be installed at a later time.

C. Mechanical Contractor shall verify utility requirements and all characteristics of operating equipment are compatible with the building utilities. Coordinate the work of all sections related and required for installing, connection and placing in service of all equipment.

D. Mechanical Contractor shall coordinate all space requirements, supports and installation of all mechanical, electrical, plumbing and fire protection work, which are indicated diagrammatically on the Drawings. Verify routing of all pipes, ducts, conduits and equipment connections. Maximize accessibility for other work, and service requirements for maintenance and repairs. Develop overall coordination drawing (all trades) and submit for review prior to fabrication/installation.

E. Obtain written confirmation from all related trade Contractors and the Owner or his representative that requirements, conflicts and coordination issues have been discussed and resolved.

F. Submit coordination drawings to verify access and clearances.

1.6 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations..

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installation within unheated shelters.

1.7 SUBMITTALS

A. Shop Drawings:

1. Shop drawings shall be submitted in accordance with Division 1 of these specifications except where herein modified.

2. Shop drawings comprising complete catalog cuts, performance test data for HVAC equipment as required by other sections of Division 23, shall be submitted for review checking. The Contractor shall review these shop drawings for conformance to contract documents prior to submission and affix contractor's signature to each submittal certifying that this review has been done. By approving and submitting shop drawings, product data, samples and similar materials, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction data that relates to the work, and has checked and coordinated this information with all of the requirements contained in the contract documents for the work of all trades.

   a. The Contractor and equipment manufacturer shall clearly indentify in all submittals and shop drawings any and all applications standards which require additional work to accommodate this equipment and provide a complete and operational system as described in the contract documents.

   b. The Contractor shall be completely responsible for any and all additional costs associated with the changes required by this and all other trades.

3. Submit a 1/4" scale layout of all mechanical equipment rooms. All equipment and pads shall be to scale of equipment being furnished. Obtain size information of any and all equipment from other trades and indicate on drawings. The drawings shall be fully coordinated with all trades prior to submission. Indicate coil pull areas, filter pull areas, maintenance clearances, and access as applicable.

4. All shop drawing submittals shall have the following identification data, as applicable, contained therein or permanently adhered thereto.

   a. Project name.
   b. Project number.
   c. Sub-contractor's, vendor's and/or manufacturer's name and address.
   d. Product identification.
   e. Identification of deviation from contract documents.
   f. Applicable contract drawings and specification section number.
   g. Shop drawing title, drawing number, revision number, and date of drawing and revision.

5. Resubmit revised or additional shop drawings as requested.

6. Wherever shop drawings or vendor's standard data sheets indicate work to be done "by others", it shall be the responsibility of the contractor making the submission to identify by name, the contractor who is to do this work. If the contractor named is other than the contractor making the submission, the shop drawing submission must be reviewed by the named contractor and bear his mark of approval, prior to submission to the Architect/Engineer.

7. Where equipment proposed differs from that shown on the drawings or specified, he shall submit for approval drawings showing the manner in which the layout is affected by the substitution.
8. The Contractor shall keep one copy of approved shop drawings at the job site,, filed in a suitable metal container. The shop drawings shall be cataloged and kept in good repair, and shall be available for use by the Owner, Architect and Engineer.

9. No equipment shall be ordered, fabricated, etc., before approval of shop drawings.

B. Contractor is responsible for the shop drawing coordination and interface with the work of other contracts and adjacent work. The relationship of Contractor's work shall be verified as it relates to adjacent and critical features of the work of this and all contracts and materials.

C. The Contractor shall submit a complete schedule of all shop drawings required for the scope of work covering all materials and equipment listed in all sections of Division 23, Mechanical, including all documents required for contract closeout, Owner instructions and training, and all turnover items at the completion of the work. This schedule shall be submitted for review and approval within thirty days of contract award and before any subsequent materials are provided for review.

D. The shop drawings provided by the Contractor will be reviewed only once and resubmittals will be reviewed only once. Any other submittals will be billed to the Contractor at the Engineer's standard rates.

1.8 SITE INSPECTION

A. The Contractor shall visit site, inspect, and become aware of all conditions which may effect the work during the estimation phase of his work prior to bid openings. Investigate utilities, protection requirements for adjacent facilities, storage locations, and access to the construction area.

B. Submission of a bid will be deemed evidence of having complied with this requirement.

1.9 SUBSTITUTIONS

A. Whenever a material, article, piece of equipment or system is identified in the following specification or indicated on the drawings by reference to manufacturers' or vendors' names, trade names, catalog numbers or the like, it is so identified for the purpose of establishing the basis of the Bid.

B. Substitution approval must be obtained and included as an addendum item prior to the submission of the bid. An approved substitution shall not be considered as an approval for the

Contractor or an equipment vendor to deviate from the written portion of the specifications unless so stated in the addendum.

C. The drawings illustrate the space allocated for equipment and the Contractor shall install the equipment accordingly. If changes are required in the building or arrangement due to substitution of equipment, the Contractor making the substitution must pay for the necessary modifications.

D. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents. This shall include, but not be limited to all: space requirements, code clearances, type-horsepower-capacities-number and size of services required from other trades including all auxiliary items provided by this Contractor and all other trades, and all manufacturer's specific equipment applications standards and requirements, for approved equipment including that which is basis of design or a substitution. The bidding related contractor and equipment manufacturers shall clearly identify in all submittals and shop drawings any and all applications standards which require additional work to accommodate this equipment and provide a complete and operational system as described in the contract documents. If the bidding contractor or manufacturer does not comply with these requirements then they shall be completely responsible for any and all additional costs associated with the changes required by this and all other trades.

E. Where only one brand name or manufacturer is identified, no substitutions are permitted.

1.10 LUBRICATION

A. Provide and maintain all required lubrication of any equipment operated prior to acceptance by the Owner. Lubrication shall be as recommended by the equipment manufacturer.

B. Provide one year's supply of lubricants to Owner at date of acceptance.

C. Verify that required lubrication has taken place prior to any equipment start-up.

1.11 EQUIPMENT START-UP

A. Verify proper installation by manufacturer or his representative.

B. Advise Construction Manager 2 days prior to actual start-up.

C. Verify proper operation. Obtain signed statement by manufacturer or his representative that equipment is operating within warranty requirements. Submit statement to Construction Manager.

D. Perform field mechanical balancing in accordance with Section 230950: TESTING AND BALANCING OF MECHANICAL SYSTEMS.

E. The Mechanical Contractor shall own as part of his work, the following:

Provide one (1) additional drive set, if necessary, to obtain final design balancing requirements. The Mechanical Contractor shall coordinate with Balancing Firm and equipment manufacturer for drive selection, including belts and pulleys.

1.12 OPERATION & MAINTENANCE INSTRUCTIONS

A. Properly and fully instruct Owner's personnel in the operation and maintenance of all systems and equipment.

B. Insure that the Owner's personnel are familiar with all operations to carry on required activities.

C. Such instruction shall be for each item of equipment and each system as a whole.

D. Provide report that instruction has taken place. Include in the report the equipment and/or systems instructed, date, contractor, Owner's personnel, vendor, and that a complete operating and maintenance manual has been reviewed.

E. Manual shall include all instructions on operation, maintenance, repair parts list, lubrication requirements, brochures, catalogue cuts, complete schedule of air filters for each unit type in Excel spreadsheet format, wiring diagrams, piping diagrams, control sequences, service requirements, names and addresses of vendors, suppliers and emergency contacts. Three manuals shall be provided.

F. Submit manuals for review prior to operating instruction period. Manuals shall be 8-1/2 x 11" with hard cover, suitably bound.

G. Provide to the Owner any special tools necessary for operation and routine maintenance of any of the equipment.

H. Upon completion of the project, the Mechanical Contractor shall provide a complete set of legible as-built drawings for the Owner.

1.13 TOOLS

A. All equipment furnished by the Mechanical Contractor which requires special tools or devices other than those normally available to the maintenance or operating staff shall be furnished in duplicate to the Owner, sufficiently marked, packed or boxed for staff usage. The tools provided shall be listed by the Mechanical Contractor identified as to their use or the equipment applicable in a written transmittal to the Owner.

1.14 CLEANING AND FINISHING

A. After equipment start-up and all operating tests have been made and the system pronounced satisfactory, each respective Contractor shall go over the entire project, clean all equipment, etc., installed by him and leave in a clean and working condition. Any surfaces found marred after this final cleaning shall be refinished or replaced by each Contractor at no cost to the Owner.

B. Provide for the safety and good condition of all materials and equipment until final acceptance by the Owner. Protect all materials and equipment from damage. Provide adequate and proper

storage facilities during the progress of the work. Special care shall be taken to provide protection for bearings, open connections, pipe coils, pumps, compressors and similar equipment.

C. All fixtures, piping, finished surfaces and equipment shall have all grease, adhesive labels and foreign materials removed.

D. All piping shall be drained and flushed to remove grease and foreign matter. Pressure regulating assemblies, traps, and similar items shall be thoroughly cleaned. Remove and thoroughly clean and reinstall all liquid strainer screens after the system has been in operation ten (10) days.

E. When connections are made to existing systems, the Mechanical Contractor shall do all cleaning and purging of the existing systems required to restore them to the condition existing prior to the start of work.

F. Clean-up: Remove from the premises, all unused material and debris resulting from the performance of work under this section.

1.15 TEMPORARY USE OF EQUIPMENT

A. The use of permanent equipment and terminal units during the construction period shall be done at the specific direction of the Construction Manager or the Owner's Representative, and as permitted by Local Code.

B. Whenever equipment has been used as directed, the Mechanical Contractor shall change unit filters as required in other sections of Division 23, as well as vacuum clean the interior of all unit enclosures to a like-new condition, including cleaning of coils. Under no circumstances will energy recovery equipment be used for temporary purposes.

C. Mechanical Contractor shall also vacuum clean the interior of all connecting ductwork, fittings, dampers, air outlets and inlets.

D. Mechanical Contractor shall also provide the Owner with a full and complete warranty required in other sections of Division 23 and the General Conditions of the contract.

PART 2 – PRODUCTS

2.1 GENERAL

A. All material and equipment shall be new and of present day manufacture, and shall conform to accepted standards of the trade where such a standard has been established for the particular type of equipment or material.

B. Whenever equipment or material is referred to in the singular, such as "the fan", it shall be deemed to apply to as many such items as necessary to complete the work.

2.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During loading, transporting and unloading exercise care to prevent damage to material.

B. Store all materials in dry enclosures or under protective coverings out of way of work progress.

C. Material shall not be allowed to be stored directly on ground.

D. Deliver in manufacturer's original cartons or on skids.

E. Handle and protect so as to prevent damage to product or any surrounding material.

2.3 WARRANTY

A. Wherever in the specification sections of this division, reference is made to a specific warranty period, this warranty shall be in addition to and not a limitation of other rights the Owner may have against the Mechanical Contractor under the contract documents.

PART 3 – EXECUTION

3.1 PROTECTION

A. Plug or cap open ends of piping systems, conduit and ductwork.

B. Stored materials shall be covered to prevent damage by inclement weather, sun, dust or moisture.

C. Protect all installed work until accepted in place by the Owner.

D. Plates, polished metal escutcheons, thermostats and other finished devices shall not be installed until masonry, tile, and painting operations are complete unless otherwise protected.

E. Protect all work from operations which may cause damage such as hauling, welding, soldering, painting, insulating and covering.

3.2 WORKMANSHIP

A. Install all work neat, trim and plumb with building lines.

B. Install work in spaces allocated.

C. Cutting and patching shall be performed by skilled tradesmen normally employed for the work involved.

D. This Contractor shall provide a complete weathertight seal to all new systems in the building including the necessary caulking, weather-stripping and insulation.

3.3 EQUIPMENT SETTING

A. Provide as a minimum, spring vibration isolation under any equipment 10 HP and over and rubber in shear vibration isolation on any equipment up to 10 HP. For further specifications and additional requirements, refer to other sections.

3.4 FASTENERS, HANGERS AND SUPPORTS

A. Provide all hangers and supports required to suspend, mount, or hang the work.

B. Provide all miscellaneous steel angles, channels, beams, clips, brackets and anchors necessary to hang or support the work. Provide submissions for review.

C. Drilled inserts shall not be loaded more than 1/4 rated capacity.

D. Power-driven fasteners shall not be allowed for piping larger than 2 inch, or equipment. When used they shall not be loaded more than 1/8 rated capacity or 200 pounds.

E. All hangers, miscellaneous steel, braces and supports shall be galvanized, cadmium plated, or primed steel. Copper tubing shall be supported with copper hangers.

F. Piping shall be supported from adjustable clevis type hangers with insulation pipe saddles or pipe shields in accordance with piping support spacing table on the drawings. Where hangers are 18" or longer provide lateral bracing at every fourth hanger.

G. Support vertical piping at floor levels. Piping shall have split rings.

H. Any lintels required for openings for this work if not indicated on Architectural or Structural drawings shall be provided under this Section.

I. Piping on the roof shall be supported by an engineered, prefabricated hanger system specifically designed for installation on the roof without roof penetrations, flashing or damage to the roofing material. The system shall consist of bases made of high density polypropylene plastic with additives for UV protection, hot dipped galvanized structural steel frames, hangers, fasteners, rods, etc. The system shall be complete and designed to fit the piping installed under actual conditions of service. The system shall be furnished as manufactured by PHP Systems & Design.

3.5 SLEEVES

A. Provide each pipe, duct or conduit passing through a masonry or concrete wall, floor or partition with a sleeve made from standard weight steel pipe for pipe or conduit and No. 12 gauge galvanized steel for ducts, with smooth edges, securely and neatly cemented in place. Provide each pipe, duct or conduit passing through a frame or metal partition with a sleeve made from No. 22 gauge galvanized sheet metal, securely fastened in place.

B. Be responsible for the proper location and alignment of all sleeves.

C. Provide hydrostatic seals for sleeves passing through outside walls, either above or below grade, or through hydrostatically sealed slabs or floors on grade. Provide fire-rated seals for all sleeves which penetrate fire-rated walls.

D. Install both piping and sleeve seals so as to maintain integrity of seals with expansion and contraction of piping.

E. Set floor sleeves flush with floor surface in finished areas, 1" above the finished floor in kitchens, cafeterias, and similar service areas unless such areas are slab-on-grade; 1" above the floor in mechanical rooms, pipe chases, pipe spaces and other unfinished areas, unless otherwise indicated, and flush with the underside of slabs. Extend wall and partition sleeves through and cut flush with each surface unless otherwise indicated or specified.

F. Select sleeves two pipe sizes larger than any pipe or conduit that is to remain uncovered, unless otherwise required by the sealing method specified. Where pipes are to be covered, provide sleeves large enough to allow the covering to pass through the sleeves with sufficient clearance for sealing as specified hereinafter. Size sleeves for branch piping from vertical risers large enough to permit vertical expansion at the riser.

G. Select duct sleeve sizes to suit requirements of fire and/or smoke dampers (Choice) and sealing methods as specified.

H. Place sleeves imbedded in concrete floors or walls in the forms before concrete is poured; sleeves shall have integral waterstop flanges, where they are to receive either watertight or hydrostatic seals.

I. Install sleeves passing through above-grade floors of mechanical rooms, toilet rooms, kitchens or similar service areas where liquid leaks or spillover may occur in a watertight manner. Sleeves shall be such that waterproofing membrane can be flashed around and into the sleeve where necessary.

J. Hydrostatic Sealing Method: Provide compressible synthetic rubber seals, equivalent to LINK SEAL, manufactured by the Thunderline Corporation, or THRUWALL manufactured by O.Z. Gedney. Install seals in accordance with the manufacturer's recommendations to provide air tightness aboveground and hydrostatic sealing belowgrade. Caulking or other type mastic is not acceptable.

K. Fire-Rated Sealing Method:

1. Sleeves, openings and sealants shall comply with applicable codes, recommended practices and standards, and manufacturer's instructions. Fire sealants shall have ability to prevent spread of flame, smoke or water throughout the penetration and shall pass 3 hour test, UL test ASTM E814 and UL 1479.

2. Products: Chase Corporation CTC PR-855, O. Z. Gedney CRS/CAFS, 3M Electro-Products Division Putty 303 or Caulk CP25 penetration sealing kits, General Electric Company sealants type RTV-850, 6428 or 7403, Thunderline Corporation "Link-Seal Pyro-Pak". Installation and type of sealant to be used as recommended by the manufacturer.

3.6 PLATES

A. Provide chrome plated plates wherever piping passes into finished area.

B. Plates shall be securely fastened to piping or building construction.

C. Floor plates shall cover 1 inch sleeve extension.

3.7 OFFSETS, TRANSITIONS, MODIFICATIONS

A. Provide all offsets necessary to install the work and to provide clearance for other trades.

B. Maintain adequate headroom and clearance.

C. Incidental modifications necessary to the installation of the systems shall be made as necessary and as approved by the Architect.

3.8 RECESSES

A. Furnish information to the Construction Manager as to sizes and locations of recesses required to install panels, boxes, and other equipment or devices which are to be recessed in walls.

B. Make offsets or modifications as required to suit final locations.

3.9 LABELING

A. All HVAC equipment such as pumps, fans, air handling units, and devices requiring identification for operating procedures shall be provided with permanent black laminated micarta white core labels with 3/8 inch letters.

B. This shall also apply to all controllers, remote start/stop pushbuttons and equipment cabinets.

C. This shall not apply to individual room thermostats.

D. All Mechanical Rooms shall be identified with a permanent placard of red-white-red laminated, commercial grade, plastic construction. Letters shall be minimum one inch high and read in capital letters: WARNING – MECHANICAL EQUIPMENT ROOM – LIMITED ACCESS. Placard shall be centered on each door leading into the mechanical room at five feet above the floor and attached at each corner with brass screws.

3.10 FLASHING AND COUNTERFLASHING

A. Roof curbs, etc., shall have counterflashing fittings. General Contractor shall provide flashing.

B. Piping and conduit thru the roof shall be flashed by the General Contractor. Provide counterflashing.

C. Provide curbs with base features required to match roof materials, finishes and configuration; e.g., flat, sloped, raised seam, etc.

3.11 ACCESS

A. Locate all equipment, valves, devices and controllers which may need service in accessible places.

B. Where access is not available, access panels shall be provided. Furnish access panels to the Construction Manager for installation.

C. Access panels shall be Nailor-Hart Industries, Karp Co., or Controlled Air Manufacturing Limited, with 16 gauge frames and 14 gauge steel door, prime painted.

D. Maintain access clearances for tube or fan removal, coil pulls, and filter removal.

3.12 WIRING AND MOTOR CONTROLS

A. Packaged equipment shall be furnished with disconnect switches, starters, overloads, factory furnished and wired by the unit manufacturer.

B. Roof-mounted exhaust fans, except utility sets, rated less than 1/2 HP at 115 volts, single phase, shall be furnished with disconnect switches, factory furnished and wired by unit manufacturer.

C. Rooftop equipment shall be furnished with starters, disconnect switches, overloads, factory furnished and wired by unit manufacturer.

D. This Contractor shall furnish all information and assistance required for the Electrical Contractor to purchase all motor starters that are not specified to be part of the mechanical equipment.

E. Control wiring shall be provided under this Division of the work.

F. All wiring shall be in accordance with the National Electrical Code and as recommended by the equipment manufacturer.

3.13 UTILITIES

A. Do not interrupt any utility or service to the Owner without adequate previous notice and schedule.

3.14 OPENINGS - CUTTING, REPAIRING

A. This Contractor shall cooperate with the work to be done under other sections in providing information as to openings required in walls, slabs and footings for all piping, ductwork and equipment, including sleeves where required.

B. Any drilling or cutting required for the performance of work under this Section, shall be the responsibility of this Contractor and the cost thereof shall be borne by him.

C. Holes in Concrete: Sleeves shall be furnished, accurately located and installed in forms before pouring of concrete. This Contractor shall pay all additional costs for cutting of holes as the result of the incorrect location of sleeves. All holes through existing concrete shall be either core drilled or saw cut. All holes required shall have the approval of the Structural Engineer prior to cutting or drilling.

D. It shall be the responsibility of this Contractor to ascertain that all chases and openings are properly located.

3.15 PAINTING

A. Refer to the Construction Manager's Scope of Work.

3.16 GUARANTEE

A. All work shall be guaranteed to be free from defects for a period of one year of operation from date of acceptance by the Owner.

B. Guarantee shall be extended on an equal time basis for all non-operational periods due to failure within the guarantee period.

C. All materials and equipment provided and/or installed under this section of the specifications shall be guaranteed for a period of one year from date of acceptance of the work by the Owner unless otherwise specified in Division 1. Should any trouble develop during this period due to defective materials or faulty workmanship, the Mechanical Contractor shall furnish necessary labor and materials to correct the trouble without any cost to the Owner. Any defective materials or inferior workmanship noticed at time of installation and/or during the guarantee period shall be corrected immediately to the entire satisfaction of the Owner.

D. In the event of occupancy by the Owner prior to final acceptance of the project, the guarantee date for equipment placed in operation shall be mutually agreed to by the Mechanical Contractor and the Owner's representative.

3.17 DRAWINGS

A. The Mechanical Systems are indicated on the Contract Drawings. Certain pertinent information and details required by the Mechanical Work appear on the Architectural, Structural and Electrical Drawings; become familiar with all drawings, and incorporate all pertinent requirements.

B. Drawings are diagrammatic and indicate the general arrangement of systems and requirements of the work. Do not scale drawings. Exact locations of fixtures and equipment, not specifically shown, shall be obtained before starting work.

3.18 TESTING AND BALANCING OF MECHANICAL EQUIPMENT

A. Perform field mechanical balancing in accordance with Section 230950: TESTING AND BALANCING OF MECHANICAL SYSTEMS.

B. The Mechanical Contractor shall own as part of his work, the following:

Provide one (1) additional drive set, if necessary, to obtain final design balancing requirements. The Mechanical Contractor shall coordinate with Balancing Firm and equipment manufacturer for drive selection, including belts and pulleys.

END OF SECTION 23 02 00

SECTION 23 02 10

BASIC MATERIALS AND METHODS – HVAC

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions.

C. Refer to other sections in Division 23 for materials and methods not specified herein.

1.2 DESCRIPTION OF WORK

A. Included in this Section are the following:

1. Steel Pipe and Fittings
2. Copper Tubing & Fittings
3. Isolating Fittings
4. Unions
5. Motors

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

B. Install work to meet the requirements of the following:

1. City of Wilmington Dept. of License and Inspections
2. International Mechanical Code
3. Gas Utility Company
4. NFPA
5. OSHA
6. ASHRAE
7. Manufacturer's Standardization Society (MSS) of the valve and Fittings Industry, Inc.:

   SP-58 Pipe Hangers and Supports Materials, Design and Manufacture.
   SP-69 Pipe Hangers and Supports Selection and Application

C. Appliances and materials governed by UL requirements shall meet such requirements and bear the label.

1.4 QUALITY ASSURANCE

A. Provide adequate supervision of labor force to assure that all aspects of the specifications are being fulfilled.

B. Verify that all work and equipment is installed in accordance with manufacturer's warranty requirements.

PART 2 – PRODUCTS

2.1 STEEL PIPE AND FITTINGS

A. Water Piping:

1. ASTM A53 seamless, Schedule 40.

2. Fittings up to 2 inch shall be 150 lb. malleable iron, screwed pattern ASME B16.3. Butt weld , ASME B16.9, same thickness as pipe.

3. Fittings 2-1/2" and larger shall be butt weld ASME B16.9, same thickness as pipe.

4. Weld-O-Lets and Thread-O-Lets shall be maximum of two sizes smaller than main size; i.e., maximum of a 2-inch Weld-O-Let on a 3-inch pipe.

5. Thread tape shall be Teflon tape, 3 mils minimum thickness.

2.2 COPPER TUBING & FITTINGS

A. Refrigeration Piping:

1. Copper tubing: Type ACR, hard drawn temper.
2. Fitting: Wrought-copper, solder joints, ASME B16.22 or ASME B16.26.
3. Joints: Brazed, American Welding Society (AWS) Class BCUP-5 for brazing filler metal.

B. Water Piping:

1. Tubing: Hard drawn seamless ASTM B-88 Type "L" aboveground.
2. Soft seamless ASTM B-88 Type "K" below-ground.
3. Joint Material: Brazed joints, low temperature silver-bearing solder.
   a. Flux shall be non-toxic type and non-corrosive.
4. Fittings: ASME B16.15, B16.18, B16.22, or B16.26.

C. Condensate Drain Piping:

1. Pipe: Copper tubing Type DWV.
2. Fittings: Wrought copper solder type drainage fittings, ASME B16.23 or B16.29.

2.3 ISOLATING FITTINGS

A. Provide isolating fittings between all sections of dissimilar piping materials or piping and equipment where one material is ferrous and the other is non-ferrous.

B. Manufacturer: Epco Sales, Inc., or insulated unions by Central Plastic Co.

2.4 UNIONS

A. Up to and including 2 inch pipe size: Screwed pattern, bronze-to- bronze seat.

B. Above 2 inch pipe size: Flanged pattern, A.S.A. forged steel, with gaskets, bolts and nuts.

C. Copper tubing unions shall have sweated type ends. Flanged unions on copper tubing may be soldered connections.

D. Materials and pressure ratings shall be the same as specified for the respective pipe and fitting system unless otherwise specified.

2.16 MOTORS

A. All single phase and polyphase motors shall be manufactured to incorporate the latest NEMA standards.

B. All single phase and polyphase motors shall have steel frames with ball bearings and copper windings. All motors to have a Class "F" insulation system with a service factor of 1.15.

C. All motors shall be 1725 RPM, 4 pole design, unless otherwise noted on the drawings, or in the equipment specifications.

D. Motors installed indoors and not exposed to moisture shall be open, dripproof, Class B temperature rise based on 40 deg. C maximum ambient temperature.

E. Motors installed outdoors and exposed to moisture shall be totally enclosed, fan cooled, Class B temperature rise based on 40 deg. C maximum ambient temperature.

F. Based on NEMA Standards, motors shall comply with the following minimum nominal efficiencies at full load.

Nominal Efficiencies for "NEMA Premium ™" Induction Motors Rated 600 Volts or Less (Random Wound)						
	Open Drip-Proof			Totally Enclosed Fan-Cooled		
HP	3500 RPM	1800 RPM	1200 RPM	3500 RPM	1800 RPM	1200 RPM
1	82.5	85.5	77.0	82.5	85.5	77.0
1.5	86.5	86.5	84.0	87.5	86.5	84.0
2	87.5	86.5	85.5	88.5	86.5	85.5
3	88.5	89.5	85.5	89.5	89.5	86.5
5	89.5	89.5	86.5	89.5	89.5	88.5
7.5	90.2	91.0	88.5	91.0	91.7	89.5
10	91.7	91.7	89.5	91.0	91.7	90.2
15	91.7	93.0	90.2	91.7	92.4	91.0
20	92.4	93.0	91.0	91.7	93.0	91.0
25	93.0	93.6	91.7	93.0	93.6	91.7
30	93.6	94.1	91.7	93.0	93.6	91.7

G. Motor Characteristics: Refer to Equipment Schedules for specific data.

277/480 Volt System: Motors 1/2HP & Larger - 480V, 3 Phase, 3 Wire
Motors Less than 1/2HP-120/277V, 1 Phase, 2 Wire.

H. All motors rated less than 1/2HP shall have thermal protection of the auto-reset type as an integral part of the motor.

I. All motors rated 1/2HP and larger shall have thermal protection provided by an external device.

J. Whenever a variable frequency PWM drive is installed to control an AC motor, a maintenance-free, circumferential, conductive micro fiber shaft grounding ring shall be installed on the AC motor drive end to discharge shaft currents to ground. Recommended part: AEGIS SGRTM Bearing Protection Ring, as made by Electro Static Technology. Install in accordance with the manufacturer's written instructions.

PART 3 – EXECUTION

3.1 PIPING SYSTEMS

A. All piping to drain to low points. Low points shall be provided with drain valves with hose thread.

B. All piping shall be arranged to have air vents at high points.

1. Air vents shall be automatic in operation when located in Mechanical Equipment Rooms. All air vents shall be provided with a PVC drain line which shall be routed to the nearest floor drain. Several air vents may be tied together.

2. Air vents shall be manual in operation in all other locations.

C. Do not install trapped lines where water cannot be drained or air can accumulate without being vented.

D. Piping shall run square with building lines.

E. Piping shall not be insulated or covered until tested.

F. Necessary drains, off-sets, vents and drips shall be provided for coordination of the work as part of the contract.

G. Running or close nipples are not permitted.

H. Piping shall not be installed over electrical transformers, panels, switchgear, substations, and control panels.

I. Exposed insulated piping risers in unfinished spaces shall be covered with 22 gauge galvanized steel sleeves from floor to ceiling. Refer to Section: Insulation & Covering – HVAC for additional requirements.

J. Allow clearance for expansion and contraction.

K. Install eccentric piping fittings where change in sizes occurs in piping systems. Tops of pipes to remain level.

L. Install isolating fittings between sections of ferrous and non-ferrous pipe or connected equipment.

M. Do not support piping from other piping, conduits or equipment.

N. Strainers shall be installed on inlets of control valves, and where indicated on drawings.

O. Unions shall be provided adjacent to all valves, at equipment connections, and where necessary to facilitate dismantling of the piping system.

P. Material Requirements for Systems:

1. Heating Hot Water Supply & Return Piping:

   a. Schedule 40 black steel.
   b. Type L hard copper.

2. Dual Temperature Water Supply & Return Piping:

   a. Schedule 40 black steel.
   b. Type L hard copper.

3. Condensate Drain (including pumped condensate):

   a. Type DWV copper.

4. Refrigerant Piping: Type ACR hard copper.

3.2 TAGS, CHARTS AND IDENTIFICATION

A. See Paragraph "Labeling" in GENERAL PROVISIONS for equipment labeling.

B. Identify each valve in all systems with black, numbered and stamped 1- 1/2" brass or aluminum tags fastened to valve by brass chain and S-hook.

C. Provide 1/8" scale diagrams showing location, number and service or function of each tagged item.

1. Frame diagrams in approved metal frames with clear acrylic front, hinges, and locks.

2. Secure to wall in Mechanical Room.

3. Provide two additional separate copies permanently covered and bound.

   a. Include one (1) copy in the Operation and Maintenance Manuals.

D. Piping Identification: Identify piping with Seton "Setmark" or Brimar, semi-rigid plastic, wraparound pipe markers with flow arrows and conforming to ANSI A13.1. Locate marker at each valve, changes in direction, where pipes pass thru barriers and every 25' of horizontal runs. Lettering on background shall be in accordance with the following colors:

Legend		Background	Lettering
1.	Gas	- Yellow	- Black
2.	Heating Water Supply	- Yellow	- Black
3.	Heating Water Return	- Yellow	- Black
4.	Dual Temperature Water Supply	- Yellow	- Black
5.	Dual Temperature Water Return	- Yellow	- Black
6.	Refrigerant Liquid	- Yellow	- Black
7.	Refrigerant Gas	- Yellow	- Black

E. Provide color coded 1” diameter markers on ceiling tile grids to indicate system and valve locations.

Hot Water: - Red

F. Manufacturers: Seton “Setmark”, Brimar, B-Line MSI.

3.3 WELDING

A. All concealed and inaccessible black steel piping shall be welded.

B. All black steel piping larger than 1-1/4 inch may be fusion welded.

C. All elbows, tees and branch connections shall be made with welding fittings ANSI B16.9.

D. Welding shall be in accordance with the ASME Boiler and Pressure Vessel Code Section IX.

E. Furnish welder test certificate for review. Certificates of successful qualification by the following organizations shall be acceptable.

1. ASME Boiler and Pressure Vessel Code
2. ANSI Code for Pressure Piping
3. National Certified Pipe Welding Bureau
4. Military Specification MIL-STD-248

3.4 SOLDERING/BRAZING

A. Connections between copper tubing and copper fittings shall be made with the appropriate filler metal. Flux shall be non-corrosive type as recommended by the manufacturer of the filler metal, and conforming to AWS A5.8.

B. Tubing shall be cut square and then reamed and deburred. End of tubing and inside of fitting cup shall be cleaned with steel wool and the flux shall be applied to the clean surface before joining. After joining, the excess filler metal shall be wiped off while still plastic.

C. Silver brazing alloy shall be equal to Easy-Flo by Handy and Harmon or Sta-Brite silver solder and shall be used for joints in:

1. Hot water heating piping
2. Air conditioning drain piping
3. Dual temperature water piping

D. Where the silver brazing is performed in a confined non-ventilated space, a non-toxic, cadmium-free brazing alloy such as braze 560 by Handy & Harman shall be used.

E. Refrigerant piping shall be silver brazed using Harris Sil-Fos 15 or equivalent, with nitrogen purge.

F. Bring joint to solder temperature or brazing temperature in as short a time as possible.

G. Form continuous solder bead or brazing filler bead around entire circumference of joint.

H. Wipe excess solder from joint area while solder is still plastic.

END OF SECTION 23 02 10

SECTION 23 02 15

VALVES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions.

C. Refer to other sections in Division 23 for materials and methods not specified herein.

1.2 DESCRIPTION OF WORK

A. This Section includes the following:

1. General
2. Hot Water Heating System
3. refrigerant Valves and Specialties

1.3 QUALITY ASSURANCE

A. Provide adequate supervision of labor force to assure that all aspects of the specifications are being fulfilled.

B. Verify that all work and equipment is installed in accordance with manufacturer's warranty requirements.

PART 2 – PRODUCTS

2.1 GENERAL

A. All gate and globe valves shall be designed for repacking under pressure when fully opened, and shall be equipped with packing suitable for the intended service. When the valve is fully opened, the back seat shall protect the packing and the stem threads from the fluid. All gate and globe valves shall have a gland follower. The pressure- temperature rating of valves shall be not less than the design criteria applicable to all components of the system.

B. Insofar as possible, all valves of the same type shall be of the same manufacture.

C. Valves installed above 7 ft. in Mechanical Rooms shall have chain operators.

D. All valves shall be provided with stem extensions. Valve handle shall be clear of insulation jacket.

E. Manufacturers:

Stockham
Milwaukee
Hammond
Apollo
Watts
Walworth
Nibco
Jamesbury

2.2 HOT WATER HEATING SYSTEM

A. Gate Valves - 2" and smaller:

Valves 2" and smaller shall be of Class 150 with body and union bonnet of ASTM B-62 cast bronze composition, threaded or solder ends, solid disc, copper-silicon stem, brass packing gland, Teflon- impregnated packing, and malleable handwheel.

Recommended valves:

Threaded:	Solder:
Stockham B-120 (RS)	Stockham B-124
Stockham B-130 (RS)	----
Hammond IB629	IB648
Nibco T134	S134

B. Ball Valves - 3" and smaller:

Valves 3" and smaller shall be 600 psi CWP, have cast brass bodies, replaceable reinforced Teflon seats, conventional port, blowout proof stems, chrome plated brass ball, and threaded or solder ends with extended solder cups.

Recommended valves:

Threaded:	Solder:
Stockham S-216-BR-RT	Stockham S-216-BR-RS
Worcester 4112 RT	---
Jamesbury II 1100TT	----
Apollo 70-100	Apollo 70-200
Nibco T580-70BR	S580-70BR-R
Inline 334	----

Drain valves, ½” or ¾”, shall be 600 psi CWP, with stainless steel trim, cast bronze body, 2-piece with cap and chain, full port stainless steel ball and stem, RTFE ball seat, threaded or soldered inlet connection, cap rated for 150 psi.

Recommended valve:

Stockham S-285-BR-R-66-HC

C. Gate Valves - 2-1/2" and larger:

Valves 2-1/2" and larger shall be Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged ends, with Teflon-impregnated packing and two-piece packing gland assembly.

Recommended valves:

Stockham G-623 (OS&Y) RS
Stockham G-612 (NRS)

	OS&Y	NRS
Nibco	F618-0	F639-31
Hammond IR1140		

D. Globe Valves - 2" and smaller:

Valves 2" and smaller shall be of Class 150 with body and union bonnet of ASTM B-62 bronze, copper-silicon alloy stem, brass packing gland, Teflon-impregnated packing and malleable handwheel.

Recommended valves:

Threaded:	Solder:
Stockham B-22 (Teflon Disc)	Stockham B-24 (Teflon Disc)

Stockham B-29 (Stainless trim) ----

Comp. Disc.:	S.S. Trim:
Nibco T-235-Y	Milwaukee 591A

E. Globe Valves - 2-1/2" and Larger:

Valves 2-1/2" and larger shall be Class 125 body, bronze mounted, with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged ends, with Teflon - impregnated packing and two-piece packing gland assembly.

Recommended valves:

Stockham G-512 (bronze disc)
Stockham G-514 (Teflon disc)

Hammond IR 116
Nibco F7181B

F. Check Valves - 2" and smaller:

Valves 2" and smaller shall be Class 150 with bodies and caps of ASTM B-62 bronze composition and threaded ends. Class 150 valves shall have lift-type Buna-N-disc and union caps, and are to be used in lines with globe valves.

Recommended valves:

Stockham B-322-B
Hammond IB948
Milwaukee 510

For backflow prevention in lines with gate valves, Y-pattern valves with swing-type disc are recommended.

For Class 150 Service, threaded ends:

Stockham B-321

For Class 200 Service, threaded ends:

Stockham B-345
Hammond IB949
Nibco T453-BY

G. Check Valves - 2-1/2" and Larger:

Valves 2" and larger shall be iron body, bronze mounted, with body and cap conforming to ASTM A-126 Class B cast iron, flanged ends, and swing-type disc.

Recommended valves:

Stockham G-931
Hammond IR1124
Nibco F918-B

OR

Alternative for the above listed check valves shall be Class 125/250 iron body, bronze mounted, Wafer Check Valve, with ends designed for flanged type connection, aluminum bronze disc, EPDM seats, 316 stainless steel torsion spring, and hinge pin.

Recommended valves:

Stockham WG-971

Mission K12 HMP
Center Line CLC Series
Marlin A125 HZDSF

2.3 REFRIGERANT VALVES & SPECIALTIES

A. Service Valves:

1. Globe Shutoff Valves: Forged brass, packed, back seating, winged seal cap, 300 degrees F (149 degrees C) temperature rating, 500 psi working pressure.

2. Check Valves: Forged brass, accessible internal parts, soft synthetic seat, fully guided brass piston and stainless steel spring, 250 degrees F (121 degrees C) temperature rating, 500 psi working pressure.

3. Manufacturers:

   Henry Valve Co.
   Parker Hannifin Corp., Refrigeration & Air-Conditioning
   Sporlan Valve Co.

B. Solenoid Valves:

1. 2-way Solenoid Valves: Forged brass, designed to conform to ARI 760, normally closed, teflon valve seat, NEMA 1 solenoid enclosure, 24-volt, 60 Hz., UL-listed, 1/2" conduit adapter, 250 degrees F (121 degrees C) temperature rating, 400 psi working pressure.

2. Manufacturers:

   Alco Controls Div., Emerson Electric Co.
   Automatic Switch Co.
   Sporland Valve Co.

C. Specialties:

1. Refrigerant Strainers: Brass shell and end connections, brazed joints, monel screen, 100 mesh, UL listed, 350 psi working pressure.

2. Moisture-Liquid Indicators: Forged brass, single port, removable cap, polished optical glass, solder connections, UL listed, 200 degrees F (93 degrees C) temperature rating, 500 psi working pressure.

3. Refrigerant Filter-Driers: Corrosion-resistant steel shell, steel flange ring and spring, wrought copper fittings, ductile iron cover plate with steel cap screws, replaceable filter-drier core, 500 psi working pressure.

4. Evaporator Pressure Regulators: Provide corrosion-resistant, spring loaded, stainless steel springs, pressure operated, evaporator pressure regulator, in size and working pressure indicated, with copper connections.

5. Refrigerant Discharge Line Mufflers: Provide discharge line mufflers as recommended by equipment manufacturer for use in service indicated, UL listed.

6. Manufacturers:

   Alco Controls Div., Emerson Electric Co.
   Henry Valve Co.
   Parker-Hannifin corp., Refrigeration & Air Conditioning Div.
   Sporlan Valve Co.

PART 3 – EXECUTION

3.1 PIPING SYSTEMS

A. All piping to drain to low points. Low points shall be provided with drain valves with hose thread.

B. Valve body construction shall match piping system material.

C. Install isolating fittings between sections of ferrous and non-ferrous pipe or connected equipment.

D. Valves shall be installed with stems above horizontal.

E. Valves shall be installed on all sides of equipment and control valves to allow isolation for repair.

F. Unions shall be provided adjacent to all valves, at equipment connections, and where necessary to facilitate dismantling of the piping system.

3.2 TAGS, CHARTS AND IDENTIFICATION

A. Identify each valve in all systems in accordance with requirements of Section 230210.

END OF SECTION 23 02 15

SECTION 23 02 30

INSULATION & COVERING – HVAC

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

1.2 DESCRIPTION OF WORK

A. This Section includes insulation and covering provided on the following piping and equipment:

1. Hot Water Heating Piping
2. Dual temperature water piping.
3. Refrigerant Piping.
4. Exterior Piping

B. Insulation shall be installed on the following duct systems:

1. All supply ductwork.
2. All return ductwork.

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this section.

B. Install insulation in accordance with manufacturer's recommendations.

C. Provide adequate supervision of labor force to assure that all aspects of the specifications are being fulfilled.

1.5 SUBMITTALS

A. Submit shop drawings, installation instructions, and manufacturer's literature of all materials specified in accordance with Section 230200.

B. Submit fabrication instructions for pipe fitting and valve insulation.

C. Submit manufacturer's joining recommendations for butt joints and longitudinal seams.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements.

PART 2 – PRODUCTS

2.1 PIPE INSULATION MATERIAL

A. Fiberglass:

1. Material: Preformed fiberglass bonded with resin to form circular pipe sleeves with factory applied, white all service jacket bonded to reinforced foil vapor barrier jacketing. The jacket shall have factory applied double pressure-sensitive, self-sealing adhesive closure and vapor sealing of longitudinal joints. Thermal conductivity: 0.24 Btu/Hr./SF/inch at 100 degrees F. Flame spread of 25 and developed smoke of 50 or less.

2. All Valves and Fittings:

   a. Glass fiber insert and premolded PVC cover, Johns Manville Corp. "Zeston" and "Hi-Lo Temp Inserts" for fittings. Glass fiber must fill the entire space within the cover completely.

   b. Factory molded fibrous glass fitting covering for fittings. Coat ends with Fosters 30-36 lagfast adhesive

   c. Mitered sections of pipe covering for valves.

3. Manufacturers: Johns Manville Corp., Certain-Teed, Owens- Corning, Knauf.

B. Closed Cell:

1. Material: Flexible elastomeric foamed plastic closed cell structure insulation 25/50 rated with a flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2. Flexible pipe insulation shall be a foamed plastic closed cell structure material, with a thermal conductivity of not more than 0.27 Btu/Hr./Sq. Ft./Inch at a mean temperature of 75°F. The insulation shall have an average density of at least 2 pounds per cubic foot, shall be self-extinguishing, and shall have a water vapor transmission rating of not more than 0.1 perms. Between temperature limits of -40°F and plus 220°F, the insulation shall not indicate any deviation from its original state.

3. Specification Compliance:

   ASTM-E-84
   ASTM-C-534 Type I – Tubular, Type II – Sheet.

ASTM-D-1056, 2B1 – Tubular, Sheet.
MIL-C-3133B (MIL STD 670B) Grade SBE-3
MIL-P-15280J, Form T, Form S.

4. Manufacturers: Armacell, Nomaco K-Flex, Halstead.

C. Covering of Pipe Insulation Outdoors:

1. Wrapping: Wrap insulation with embossed 0.016" aluminum jacket.
2. Fastenings: Cover shall be held in place with soft aluminum bands on 12" centers.
3. Valves and Fittings: Weatherproof all valves and fittings.

D. Manufacturers: Johns Manville Corp., Certain-Teed, Owens- Corning, Knauf.

2.2 DUCT INSULATION

A. Concealed Supply and Return Air Ductwork: Fiberglass duct wrap bonded with resins, 3/4 pound density, aluminum foil facing reinforced with fiberglass scrim, laminated to Kraft, 2" thick.

1. Thermal Conductivity: 0.27 Btu/Hr./SF/Inch at 75°F. Min. installed "R" value w/25% compression shall be 5.6.

2. Duct wrap shall be cut to stretch-out dimensions as provided in manufacturer's instructions. Remove a 2" piece of insulation from the facing at the end of the piece of insulation to form an overlapping staple and tape flap. Install with facing outside so tape flap overlaps insulation and facing at other end. Insulation shall be tightly butted and not compressed excessively at duct corners. Seams shall be stapled 6" on center with outward clinching staples. All seams, tears, punctures and other penetrations of the insulation facing shall be sealed with foil tape or vapor proof mastic. Where rectangular ducts are 24" in width or greater, duct wrap shall be secured to the bottom of the duct with mechanical fasteners; i.e., stick pins spaced 18" on center.

B. Exposed supply and return air ductwork shall be insulated in finished conditioned spaces, penthouse, mechanical rooms, mezzanine areas, equipment closets, and non-conditioned spaces with 2" thick rigid fiberglass board. Insulation shall be 6 P.C.F. density with a "K" value of 0.25 Btu/Hr./SF/Inch at 75 degrees F. mean temperature and shall be U.L. listed at 25 maximum for flame spread, and 50 maximum for smoke developed. Insulation shall be applied using Graham Pins or Stik-Clips and all seams, edges and breaks shall be sealed with 4" matching tape and sealed with Vicryl CP-10 to match ASJ jacket. Insulation shall be provided with all-service jacket facing.

C. Manufacturers: Johns Manville Corp., Certain-Teed or Owens- Corning, Knauf.

D. Outdoor Installation:

1. Two inch (2") thick Arma Tuff supplied in sheet and roll forms laminated with a white, 0.012" thick thermoplastic rubber membrane.

2. Material shall be resistant to ozone and ultraviolet radiation with a of 10 year limited warranty against breakdown of the membrane.

3. Thermal conductivity shall be 0.25 at 75°F mean temperature with a vapor permeability of 0.05 perm-inch for the foam and 0.00 for the laminate.

4. Insulation shall be applied using Armaflex 520 adhesive; seams shall be covered with minimum 6 inch wide self-sealing tape and minimum 6 inch wide self-sealing tape along all exposed edges. Install per manufacturer's instructions.

5. Covering of Insulation Outdoors: Minimum insulation value shall be R-8.

PART 3 – EXECUTION

3.1 INSTALLATION - GENERAL

A. Do not install until systems have been tested and meet requirements.

B. Heavy work which may damage insulation shall have been completed in the vicinity of the insulation work.

C. Provide non-compressible insulation saddles at all piping hanger locations, and at all piping hanger locations where piping is insulated with flexible closed cell insulation.

Option: Provide insulation coupling system as made by Klo-Shure Co.

D. All installations shall be made by skilled craftsmen regularly engaged in this type of work.

E. Insulation shall be continuous thru-wall, ceiling and floors.

F. Metal shields, 16 gauge galvanized, shall be installed between hangers and pipe insulation.

G. Pipe, ductwork and equipment shall be clean and dry prior to insulating.

H. Install all insulation per manufacturer's instructions.

I. To avoid undue compression of insulation, provide solid core inserts at all supports as recommended by the insulation manufacturer. Provide insulation shields between the insulation jacket and the hanger.

J. Apply vapor proof mastic as recommended by the insulation manufacturer on all longitudinal and butt joints of sectional pipe insulation. Apply similar mastic to the end of every third length of sectional pipe insulation on all chilled water and dual temperature pipe insulation to prevent the migration of condensation that might occur.

3.2 PIPE INSULATION - TYPES & THICKNESSES

A. Provide fiberglass insulation of thickness specified on:

1. Heating Hot Water: (Up to 200°F)

   1½" for piping 1½" and below
   2" for pipes 2" and over.

2. Dual Temperature Water:

   1½" for piping 1½" and below.
   2" for piping 2" and larger.

3. Refrigerant Piping: Interior locations, exposed and concealed for suction lines. (NOTE: Insulate liquid line if metering device is mounted at the condensing unit.)

   1½" thick.

B. Provide flexible closed cell insulation of thickness specified on:

1. Refrigerant Piping: Exterior Locations for suction lines. (NOTE: Insulate liquid line if metering device is mounted at the condensing unit.)

   1" thick for piping 1½" and less.
   1½" thick for piping 2" and over.

3.3 PIPE COVERING (FOAMED PLASTIC TYPE)

A. All joints and seams shall be sealed with a compatible adhesive. Approved adhesives are as follows:

   Armstrong World Industries No. 520
   Benjamin Foster Company No. 85-75 up to 200 degrees F.

   Contractor may use Armstrong Self-Seal Armaflex 2000 insulation in lieu of the above wherever 1/2" is specified.

B. Fitting covers shall be fabricated from the foamed plastic pipe insulation or from sheet insulation of the identical material. The fabrication shall be in accordance with manufacturer's instructions, and all seams mitered joints shall be joined using the adhesives described hereinbefore.

C. Pipe insulation in concealed spaces shall require no finish coatings.

D. Pipe insulation in all other areas shall receive two coats of finish of color selected by Architect. Approved finishes are as follows:

   Armstrong World Industries WB Armaflex Finish

3.4 EXTERIOR PIPE COVERING

A. Wrapping: Wrap insulation with embossed 0.016" aluminum jacket, orient seam down.

B. Fastenings: Cover shall be held in place with soft aluminum bands on 12" centers.

C. Valves and Fittings:

1. Weatherproof all valves and fittings.
2. Finish: Apply two coats of vapor resistant mastic reinforced with glass fabric over wrapping.

3.5 INTERIOR PIPE COVERING

A. Provide premolded PVC cover on all interior insulated piping exposed in finished spaces. Orient seams up in overhead piping and toward the wall in vertical runs.

B. Provide factory molded fitting covering for fittings and accessories, sealed and held in place by manufacturer's recommended sealing system.

C. Provide mitered sections of covering for valves.

END OF SECTION 23 02 30

SECTION 23 03 00

VIBRATION AND SOUND ISOLATION – HVAC

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

1.2 DESCRIPTION OF WORK

A. This Section includes providing the following vibration and sound isolation material on items furnished and installed under HVAC work:

1. Rooftop AHU's

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings, installation instructions, and manufacturer's literature of all materials specified in accordance with Section 230200.

B. Submit the following:

1. Shop drawings
2. Product data

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements.

PART 2 – PRODUCTS

2.1 GENERAL

A. All vibration control apparatus shall be furnished by a single recognized manufacturer. The manufacturer shall submit to the Architect/Engineer evidence affirming that he has been a supplier of vibration control devices of the type required for the past five years.

B. The vibration control apparatus manufacturer shall supervise, inspect, measure, and approve the installation and shall submit a report to the Architect/Engineer substantiating that all the equipment has been adequately isolated.

C. Any requests for changes in the specifications must be submitted in writing in time for review and approval through a written addendum to the specifications prior to bid closing.

D. In connecting isolated HVAC equipment to rest of system, care must be exercised to insure proper installation.

1. Equipment shall be erected on isolators or isolated foundations to correct operating height prior to making piping connections to avoid misalignment problems. To facilitate this, equipment shall be blocked-up with temporary shims to final operating height. When full load is assembled, isolators shall then be adjusted to take up load just enough to allow removal of shims.

2. Air handling equipment such as centrifugal fans shall be erected on isolators and leveled with fan operating before flexible duct connection is made. Insure that duct position is in proper alignment and providing proper clearance in proportion to flexible duct connector length. When fan is shut off, misalignment with ductwork is allowable providing it does not strain or damage flexible duct connector. In cases of high static pressure, fans requiring position stabilizers are to be adjusted when fan is operating to achieve the results as described above with isolator adjustment.

F. Vibration isolator sizes and location shall be determined by the vibration control products manufacturer or as specified herein.

G. Model numbers of Amber/Booth Co., are given for identification. Products of specified manufacturers will be acceptable, provided they comply with all of the requirements of this specification.

2.2 ISOLATOR TYPES

A. Rooftop AHU's:

1. Type RTIR: Provide an extruded aluminum rail base for rooftop air conditioning units consisting of a pair of weatherproofed aluminum rails for fastening to equipment and to roof curb incorporating wind restraints and a continuous air and water seal which is protected from accidental puncture and direct sunlight by an aluminum weather shield. Rails shall incorporate non-adjustable Type SW spring isolators properly spaced around

perimeter and sized for 1" deflection. To prevent leaks, rails shall be factory assembled (to the limits of freight carriers) and shipped as a one- piece unit.

B. Manufacturers: Amber/Booth, Kinetics Noise Control, Mason Industries, Vibration Mounting & Controls, Vibration Eliminator, Inc.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's specifications and instructions.

1. No metal-to-metal contact will be permitted between fixed and floating parts.

2. Connections to Equipment: Allow for deflections equal to or greater than equipment deflections. Electrical, drain, piping connections, and other items made to rotating or reciprocating equipment (pumps, compressors, etc.) which rests on vibration isolators, shall be isolated from building structure for first three hangers or supports.

B. Inspection and Adjustments: Check for vibration and noise transmission through connections, piping, ductwork, foundations, and walls. Adjust, repair or replace isolators as required to reduce vibration and noise transmissions to specified levels.

END OF SECTION 23 03 00

SECTION 23 06 00

AIR DISTRIBUTION & ACCESSORIES - HVAC

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

D. This Contractor shall coordinate with the work of Division 26 and the Fire Alarm System vendor for locations and mounting of all duct smoke detectors. These devices are shown on the Mechanical Drawings for reference only to show the intent of the work. All locations shall be determined based on approved shop drawings from the Fire Alarm System vendor and the Contractor for the work of Division 26, Electrical. Mount smoke detectors in the supply and return air stream at each unit in accordance with NFPA 72.

1.2 DESCRIPTION OF WORK

A. This Section includes labor, material, equipment and supervision to provide a complete air distribution system as specified herein and as shown on drawings.

1. Ductwork – Single Wall, Square and Rectangular
2. Ductwork - Spiral Round Aluminum (Pools)
3. Flexible Air Duct
4. Flexible Connections
5. Dampers
6. Air Diffusers, Registers and Grilles
7. Prefabricated Roof Curbs and Equipment Supports
8. Duct Access Doors (Interior)

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

B. Requirements established within the portions of the Project Manual titled Division 1, General Requirements, are collectively applicable to the work of this section.

C. IMC (International Mechanical Code).

D. SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.)

E. American Society of Heating, Refrigerating and Air Conditioning Engineers' recommendations in ASHRAE Guide shall apply to this work.

F. ARI Standard 885 - Standard for Estimating Occupied Sound Levels in the Applications of Air Terminals and Air Outlets.

G. UL (Underwriter's Laboratories, Inc.)

H. NFPA 90A shall apply to this work.

I. State Fire Prevention Regulations.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this Section.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 230200.

B. Submit the following:

1. Shop drawings of all sheet metal. Indicate all steel, piping, conduit, and Architectural/Structural features to demonstrate complete coordination. Scale shall not be less than ¼”.

   a. Shop drawings shall indicate the sizes and lengths of each section of ductwork as well as all system components such access doors, dampers, diffusers and register locations. Also indicate the type of joints used and where internal acoustic lining or insulation, if required, will be utilized.

   b. The location of the duct runs and the air outlets shall be closely coordinated with all other trades by the sheet metal contractor to avoid interference. The shop drawings shall show the contact surfaces adjacent to the ducts or air outlets and the space assigned for concealment. The drawings shall indicate principal items of equipment, adjacent piping and conduit, etc., the location of which shall be secured from the contractors of other trades.

   c. Sheet Metal Contractor to include resubmissions of the shop drawings to the Engineer. The resubmissions are to include all corrections to previous submissions.

2. Manufacturer's literature and performance data of all equipment and devices.

3. Samples: Furnish color samples, etc., at request of the Architect.

1.6 SUBSTITUTIONS

A. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents. This shall include, but shall not be limited to space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items furnished and installed by other trades. If the manufacturer or

related bidding contractor does not comply with these requirements, they shall be responsible for any and all additional costs associated with the changes required by other trades.

1.7 WARRANTY GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements.

PART 2 – PRODUCTS

2.1 DUCTWORK (SINGLE WALL, SQUARE AND RECTANGULAR)

A. All ductwork shall be fabricated in accordance with SMACNA "HVAC Duct Construction Standards - Metal and Flexible" latest Edition except as described below. The minimum thickness of metal ductwork is 26 gauge. Fabrication requirements shall be based on ductwork subjected to positive or negative pressures of 4" W.G. Ductwork systems shall be sealed to SMACNA "Seal Class "A" Standards. Alternatively, "Ductmate" System 45 can be used in accordance with manufacturer's specifications. Drive slip joints are not permitted.

Exception: For ductwork smaller than 12" x 8", Contractor may provide slip and drive joints with all joints sealed with Hardcast tape and mastic system.

B. Rectangular ducts for 4" W.G. or less, positive or negative pressure shall be per SMACNA Table 1-7. Longitudinal seams shall be Pittsburgh Lock Type L-l per SMACNA Figure 1-5. Transverse joints shall be standing seam type T -15 per Figure 1-4.

1. In the event that material size is not compatible with duct size and segmenting must be utilized to fabricate duct, use SMACNA Figure 1-5, seam L-4 (Standing Seam).

C. Joints:

1. Per SMACNA Transverse Joint Reinforcement Table 1-12, only joints T -22, T -25a, T -25b and Proprietary slip on flanges will be acceptable.

2. Joints T -25a and T -25b that have stress fractures from bending will not be accepted.

3. All joints will have butyl gasket 3/16" thick by 5/8" wide installed per manufacturer's -- installation instructions.

D. Ductwork systems for this standard shall be galvanized sheet steel, commercial quality of lock - forming grade, conforming to ASTM coating standards A-525 or A-527 with coating of designation G-60. For corrosive or moist conditions, use coating designation G-90.

1. Where the outer surface of the duct is exposed in finished spaces and is not scheduled for insulation, duct material shall be galvannealed, suitable for field painting by the General Contractor.

E. The size and configuration of each duct shall be indicated on design drawings. Where thicker sheets or different types of materials are required, they shall be specified on the design drawings or in the project specifications.

F. Aluminum Rectangular Ductwork:

1. Aluminum ductwork shall be two B.& S. gauges heavier than specified for the equivalent width steel ductwork. Bracing, supports and joints shall be as specified for steel ductwork.

2. Aluminum ducts shall be used where the ducts are used for all air distribution serving the Natatorium.

2.2 FLEXIBLE AIR DUCT

A. Insulated flexible air duct shall be non-metallic. Air duct shall comply with the latest NFPA Bulletin No. 90A and be labeled as Class 0 or 1 Air Duct, U.L. Standard No. 181.

B. Air ducts shall be suitable for working pressure of not less than plus 10.0 and minus 0.5 inches of W.G.

C. Non-metallic air duct shall be two element spiral construction composed of a corrosion resisting metal supporting spiral and a vinyl coated fiberglass base fabric and shall be mechanically interlocked together.

D. Insulation shall be fiberglass flexible blanket with vapor barrier outer jacket of polyethylene or reinforced mylar. Maximum thermal conductance of 0.23 Btu/Hr./SF/Inch at 75° F temperature.

E. Approved manufacturers shall include the Wiremold Company, Flexmaster Ducting Inc., Owens-Corning, Thermaflex Flex Vent.

2.3 FLEXIBLE CONNECTIONS

A. Required between ductwork and suction and discharge connection of all fans and air handlers.

B. Material: Woven fiberglass with mounting hardware tested in accordance with UL Standard 181, listed and labeled as Class 0 or 1.

C. Manufacturer: Ventfabrics, Inc., Durodyne, Dynair, Ductmate Pro Flex.

2.4 DAMPERS

A. Provide where indicated and required to control flow of air and balance system.

B. Round dampers shall be single blade, molded synthetic bearings at each end, 20 gauge galvanized steel, adjusting quadrant and locking device. Round dampers shall be Ruskin Model MDRS25.

C. Rectangular and square dampers shall be opposed blade within 16 gauge galvanized steel channel frame with corner brace, 16 gauge galvanized steel blades; molded synthetic bearings and hex steel shafts, exposed or concealed linkage, adjustable quadrant and locking device. Dampers shall be Ruskin Model MD35.

D. Approved Manufacturers: Ruskin, Arrow, Nailor-Hart, Pottorff, Lloyd Industries, Inc., Cesco Products, Louvers & Dampers.

2.5 AIR GRILLES

A. Air terminals shall be provided in duct runs on drawings.

B. Grilles:

1. Grilles shall be steel construction, fixed single deflection type, with clips and/or flange holes and screws (as required by Architectural finishes) to secure registers to ceiling construction. Face bars shall be inclined 30 degrees. Grilles shall be factory primed and painted with a baked-on white enamel finish.

2. Supply, Return, Exhaust and Transfer Grilles (SG, RG, EG & TG):

   a. Grilles shall be available parallel to the long dimension of the grille. Construction shall be of steel with a 1¼ inch wide border on all sides. Screw holes shall be countersunk for a neat appearance. Corners shall be welded with full penetration resistance welds.

   b. Deflection blades shall be firmly held in place by mullions from behind the grille and fixed to the grille by welding in place. Blade deflection angle shall be available at 35°.

   c. The finish shall be #26 white. The finish shall be a baked on anodic acrylic paint, with a pencil hardness of HB to H.

   d. Titus model: 300 RL (SG), 355RL (RG, EG, & TG)

C. Manufacturers: Provide diffusers, registers and grilles of one of the following:

Anemostat	Price
Carnes Co.	Titus
Metalaire	Tuttle & Bailey
Nailor Industries	

2.6 PREFABRICATED ROOF CURBS AND EQUIPMENT SUPPORTS

A. Factory fabricated by the manufacturer of the respective roof-mounted equipment when available and capable of meeting the following requirements:

1. Thermally and acoustically insulated, rubber isolating pads.

2. Built to suit slope of roof and type of roofing; i.e. standing metal seam with integral cant strip and flashing extension.

3. 8” to 11” height unless otherwise indicated.

4. Support rails shall be aluminum, or sheet steel, with continuous wood nailer and removable counterflashing.

B. Curbs shall be a product of a custom manufacture in the following cases:

1. Curbs as specified are not available from the respective equipment manufacturer.

2. Piping or ducts penetrating roof.

3. Prefabricated equipment supports are required.

4. Step flashing assembly, EPDM for normal use and silicone for pipe temperatures above 200°F stainless steel clamp. Suitable for single or multiple pipes.

C. Pipe supports shall be a product of a custom manufacture equal to Pipe Prop as made by JMB Industries.

D. Manufacturers: Pate, Shipman, Custom Curb, Portals Plus, Lloyd Industries, Inc.

2.7 DUCT ACCESS DOORS (Interior Locations)

A. SMACNA standard duct access doors shall be fabricated with 22 gauge galvanized steel door and frame with double wall construction.

1. Doors shall be fabricated of aluminum when installed in aluminum ductwork and stainless steel to match special duct systems.

B. Continuous piano type hinge, same material as door.

C. Latches shall be sash type locks equal to Ventlock 100 latches.

1. Doors 16" and under shall have one latch.
2. Doors over 16" shall have two latches.

D. Door seals shall be foam gasket material continuously bonded to perimeter of door frame.

E. Door insulation shall be 1" thick fiberglass, minimum 1.5 pcf density.

F. Doors shall be able to withstand 3" W.C. static pressure up to 12" x 12" in size; 2" W.C. above that size.

G. Makes: Cesco Products, Karp Co., Nailor-Hart Industries, Pottorff, Lloyd Industries, Inc., Ductmate Industries, Inc.

PART 3 – EXECUTION

3.1 DUCTWORK

A. Dimensions on drawings are inside dimensions.

B. Ducts shall be concealed unless otherwise indicated.

C. Changes in direction shall be made with radius bends or turning vanes.

D. Supports shall be galvanized steel for steel ductwork and aluminum for aluminum ductwork.

E. Locate ceiling air grilles on "Reflected Ceiling Plans". Unless otherwise indicated, locate units in center of acoustical ceiling modules.

F. Do not install ductwork directly above any electrical equipment.

G. Ductwork shall be supported per SMACNA Standards except as follows:

1. Rivet or screw to side of duct when using flat strap hangers. Rivet or screw to bottom of duct when using trapeze hangers.

2. Extend hangers down the side of the duct at least 9"; pass hangers under ducts less than 9" deep.

3. Space hangers not more than 8' on centers for ducts up to 18" wide and 4' on centers for ducts over 18" wide.

4. Wire hangers are not acceptable.

5. Support ductwork from building structure with expansion bolts, rods, steel angles or channels installed to meet existing or new building conditions.

6. Drilling into the roof deck is not permitted.

7. Driving nails into anchors is not permitted.

H. Air Flow Control:

1. Major take-offs: Install volume control dampers.

2. Branches: Install volume control dampers in all branches and at tap in branch take-off connections.

3. Elbows: Use unvaned elbows with throat radius equal to width of duct and full heel radius; provide turning vanes where full throat and heel radius are not possible.

4. Transitions: Make transitions in ducts as required by structural or architectural interferences.

a. Proportion airways to compensate for any obstructions within duct.

b. Avoid dead ends and abrupt angles.

c. Do not exceed 15 degrees slope on sides of transitions.

I. For all exterior single wall, square or rectangular ductwork, ensure that the top of all horizontal ductwork is crowned to minimize accumulation of weather on top of the finished insulation system jacket specified in Section 230230.

J. Ductwork on the roof shall be supported by an engineered, prefabricated hanger system specifically designed for installation on the roof without roof penetrations, flashing or damage to the roofing material. The system shall consist of bases made of high density polypropylene plastic with additives for UV protection, hot dipped galvanized structural steel frames, hangers, fasteners, rods, etc. The system shall be completed and designed to fit the ductwork installed under actual conditions of service. The system shall be furnished as manufactured by PHP Systems & Design.

3.2 FLEXIBLE AIR DUCT

A. When flexible duct is used for final connection between duct mains on branches and diffusers on registers. The maximum length of flexible ductwork shall be 5'-0" in length.

B. Flexible ductwork shall be properly hung at the tap collar in order to prevent eventual wear and damage to the flexible duct.

C. The ceiling tile system should not be considered a support on which to lay flexible duct. Refer to SMACNA Standards for proper installation.

3.3 DUCT SYSTEM LEAK SEALING

A. Joints in duct systems at duct heaters, air monitors, fire dampers, sound traps, supply air terminals including air handling light fixtures, shall be sealed to prevent air leakage.

B. All duct joints and seams in medium pressure and high pressure duct systems shall be sealed to SMACNA Seal Class" A" Standards to prevent air leakage.

C. In the event there is in excess of 5% air leakage indicated in low pressure duct systems, it shall be the Contractors responsibility to seal the duct system. The amount of sealing necessary shall be that required to obtain the design air quantity at each terminal.

D. Duct sealing shall be by means of high velocity duct sealants such as Hardcast and/or Neoprene gaskets. Type of sealant and method of application shall conform to recommendations in SMACNA high velocity duct construction standards.

3.4 DUCTWORK TESTING

A. The following ductwork shall be pressure leak tested:

1. Supply ductwork

2. Return ductwork
3. Exhaust ductwork

B. All tests shall be conducted in accordance with AABC National Standards.

C. Ducts to be tested at 100% maximum of static pressure before any duct is insulated externally and concealed in accordance with SMACNA Standards.

D. Calculate the allowable leakage using leakage factor of 5% of Design Air Flow.

E. Select a limited section of duct for which the estimated leakage will not exceed capacity of the test apparatus.

F. Connect the blower and flow meter to the duct section and provide temporary seals at all openings of the ductwork.

G. Start the blower motor with the inlet damper closed. Increase pressure until the required level is reached.

H. Read the flow meter and compare the leakage in cfm. Reading should be 5% or less of design flow for the duct segment being tested.

I. If reading is more than 5% of design flow, depressurize duct, repair all leaks and retest until 5% or less of design flow is obtained.

J. Complete test reports and obtain Owner's witness signature.

K. Remove all temporary blanks and seals.

L. Warning: Do not overpressure duct.

3.5 EQUIPMENT

A. Test apparatus shall consist of an airflow measuring device, flow producing unit, pressure indicating devices and accessories necessary to connect the metering system to the test specimen.

B. The Contractor conducting tests shall arrange for or provide all temporary services, all test apparatus, all temporary seals and all qualified personnel necessary to conduct the specified testing.

C. Test apparatus shall be accurate within plus or minus 7.5% at the indicated flow rate and test pressure and shall have calibration data or a certificate signifying manufacture of the meter in conformance with the ASME Requirements for Fluid Meters. Verification of above to be supplied to Owner upon request.

D. Pressure differential sensing instruments shall be readable to 0.05" scale division for flow rates below 10 cfm or below 0.5" w.g. differential. For flows greater than 10 cfm scale divisions of 0.1" are appropriate. U-tube manometers should not be used for reading less than 1" of water.

E. Liquid for manometers shall have a specific gravity of 1 (as water) unless the scale is calibrated to read in inches of water contingent on use of a liquid of another specific gravity, in which case the associated gauge fluid must be used.

F. Instruments must be adjusted to zero reading before pressure is applied.

3.6 TEST REPORT

A. Log the project and system identification data.

B. Enter the fan CFM, the test pressure, and the leakage class specified by the designer.

C. Enter an identification for each duct segment to be tested.

D. Calculate the allowable leakage factor. Enter this number on the report for each test segment.

E. Conduct and record the field tests. If the sum of the CFM measured is less than or equal to the sum of the allowable leakage, the test is passed. Record the date(s), presence of witnesses and flow meter characteristics.

F. Maintain a mechanical duct plan of all tested duct segments. Plan to include duct segment identification and dates tested.

G. Test reports shall be submitted as required by the project documents.

END OF SECTION 23 06 00

SECTION 23 06 05

FANS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

1.2 DESCRIPTION OF WORK

A. This Section includes labor, material, equipment and supervision to provide a complete air distribution system as specified herein and as shown on drawings.

1. Roof-Mounted Exhaust Fans

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

B. Requirements established within the portions of the Project Manual titled Division 1, General Requirements, are collectively applicable to the work of this section.

C. IMC (International Mechanical Code)

D. SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.)

E. American Society of Heating, Refrigerating and Air Conditioning Engineers' recommendations in ASHRAE Guide shall apply to this work.

F. UL (Underwriter's Laboratories, Inc.)

G. NFPA 90A shall apply to this work.

H. State Fire Prevention Regulations.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this Section.

1.5 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 230200.

B. Submit the following:

1. Shop drawings of all sheet metal. Indicate all steel, piping, conduit, and Architectural/Structural features to demonstrate complete coordination. Scale shall not be less than 1/4" = 1'-0".

2. Manufacturer's literature and performance data of all equipment and devices.

1.6 SUBSTITUTIONS

A. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents and as described within the specifications. This shall include, but shall not be limited to space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items furnished and installed by other trades. If the manufacturer or related bidding contractor does not comply with these requirements, they shall be responsible for any and all additional costs associated with the changes required by other trades.

1.7 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements.

PART 2 – PRODUCTS

2.1 ROOF-MOUNTED EXHAUST FANS

A. Aluminum casing shall be heavy gauge, mill finish of spun construction, weatherproof, removable, with aluminum birdscreen.

B. Aluminum centrifugal fan, adjustable V-belt drive selected for 150% of motor ampere rating.

C. Fans shall be quiet operating, selected for sound level below that of the space ventilated.

D. Accessories: Disconnect switch, insulated roof curb and motor-operated damper.

E. Manufacturers: Penn Ventilator Co., Greenheck, Loren Cook, Acme, Carnes, Breidert, Hartzell.

PART 3 – EXECUTION

3.1 FANS, EQUIPMENT AND ACCESSORIES

A. Install in accordance with manufacturer's details and instructions.

B. Mount fan speed control at the fan to facilitate mechanical balancing. Power wiring shall be part of the work of Division 26.

C. Perform field mechanical balancing in accordance with Section 230950: TESTING AND BALANCING OF MECHANICAL SYSTEMS.

D. Install units in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.

E. Support: Install and secure roof curb structure, in accordance with National Roofing Contractor's Association (NRCA) installation recommendations and shop drawings. Install and secure units on curbs and coordinate roof penetrations and flashing.

F. The Mechanical Contractor shall own as a part of his work, the following:

Provide one (1) additional drive set, if necessary, to obtain final design balancing requirements. The Mechanical Contractor shall coordinate with Balancing Firm and equipment manufacturer for drive selection, including belts and pulleys.

END OF SECTION 23 06 05

SECTION 23 07 25

TERMINAL HEATING UNITS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

1.2 DESCRIPTION OF WORK

A. This Section includes work necessary and/or required and materials and equipment for construction of a complete system. Such work includes, but is not limited to the following:

1. Cabinet Heaters

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this Section.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 230200.

B. Submit shop drawings and descriptive date for all equipment specified in this section.

1.6 SUBSTITUTIONS

A. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents. This shall include, but not limited to, space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items furnished and installed by other trades. If the manufacturer or related bidding contractor does not comply with these requirements, this Contractor shall be responsible for any and all additional costs associated with the changes required by other trades.

1.7 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements.

PART 2 – PRODUCTS

2.1 CABINET HEATERS

A. Provide cabinet heaters including chassis, heating elements, fans, motor and insulation.

B. Chassis: Galvanized steel wraparound structural frame with edges flanged.

C. Insulation: Faced, heavy density glass fiber.

D. Cabinet: Vertical semi-recessed/recessed/surface-mounted model as scheduled on the drawings, 16 gauge four sided overlap front panel with stiffeners. Clean cabinet parts, bonderize, phosphatize, and flow-coat with baked-on primer.

E. Coils: Aluminum fins, copper tubes, mechanically expanded for a permanent bond. Provide manual air vent.

F. Grilles: Intake and outlet grilles shall be integral, stamped 15 degrees deflection.

G. Fans: Provide direct drive centrifugal, forward curved double width fan.

H. Motors: Provide two-speed permanent split capacitor type motors (or variable speed) with integral overload protection and motor cords for plug-in to junction box in unit.

I. Provide HI/LO/OFF fan control (concealed).

J. Manufacturers: Airtherm Manufacturing Co., American Air Filter, Embassy Industries, McQuay, Modine, Rittling, Sterling, Trane, Vulcan.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which equipment is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF CABINET HEATERS

A. Install cabinet heaters in accordance with manufacturer's installation instructions.

B. Locate cabinet heaters as shown on the drawings. Coordinate with other trades.

C. Protect units with protective covers during balance of construction.

END OF SECTION 23 07 25

SECTION 23 07 32

TERMINAL HEAT PUMPS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

1.2 DESCRIPTION OF WORK

A. This Section includes work necessary and/or required and materials and equipment for construction of a complete system. Such work includes, but is not limited to the following:

1. Packaged Terminal Heat Pump

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

B. Media type air filters shall comply with U.L. Standard 900.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 230200.

B. Submit shop drawings and descriptive date for all equipment specified in this section.

1.6 SUBSTITUTIONS

A. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents. This shall include, but not limited to, space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items furnished and installed by other trades. If the manufacturer or related bidding contractor does not comply with these requirements, this Contractor shall be responsible for any and all additional costs associated with the changes required by other trades.

1.7 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements. In addition, the following special guarantee applies:

1. Each compressor unit shall be provided with manufacturer's five (5) year warranty.

PART 2 – PRODUCTS

2.1 PACKAGED TERMINAL HEAT PUMP

A. Cabinet and Finish: Sleeve and unit chassis are heavy, 18-gauge, phosphatized, galvanized steel.

B. The filter shall be accessed by removing the front panel. To clean the coils and service the unit, the front panel of the unit chassis is removable.

C. Discharge:

1. Unit has sloped discharge so that obstructions are not placed on unit.

2. Discharge is directed into the room at an angle and can be adjusted by reversing the discharge grille.

D. Control:

1. The control panel shall provide the following functions:

Rotary Switch:

OFF - Turns unit off.
FAN ONLY - Indoor fan operates
COOL - Provides cooling with indoor fan.
HEAT - Provides heating with indoor fan.

Rocker Switch:

HI - Provides Hi fan speed.
LOW - Provides low fan speed.

Unit-mounted thermostat senses air dry bulb temperature at the coil inlet with a remote sensing bulb and is adjustable.

E. Outside Air Damper: Control lever is located on the unit behind the chassis' front panel. Zero cfm outside air (closed) or fully open 60 cfm (open).

F. Refrigeration System: Compressor is fully hermetic, and externally isolated to ensure elimination of compressor sound and vibration. Tubing connections to compressor are looped to further isolate vibration.

G. A capillary tube expansion device:

1. Used to ensure proper refrigerant flow throughout the system's operating range to maintain operating efficiency.

2. Coils use seamless copper tubing mechanically expanded into configured aluminum plate fins. Coils are each tested at 455 psi.

H. Motors: All motors are high efficiency, permanent split capacitor type. Provide separate motor for evaporator and condenser fans.

I. Electrical: Units shall have factory installed cord. Power connection using the cord shall be made to a receptacle in the sub-base.

J. Electric Supplemental Heaters: Slide-in heater module mounted in unit discharge air passage. Elements are constructed of heavy duty nickel chromium internally connected on single phase.

K. Sub-Base: Attaches to wall sleeve to provide concealed cord path to chassis and for cord connection used as service disconnect, provide two leveling screws and receptacles.

L. Exterior Grille: A horizontal louver aluminum grille in mill finish.

M. Manufacturers: Amana, Carrier, Climate Master, Fredrick, McQuay, Trane.

1. Any listed equivalent manufacturer and the Mechanical Contractor shall be completely responsible to comply with all requirements on the contract documents. This shall include, but not be limited to, space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which equipment is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

B. Install in accordance with manufacturer's recommendations. Unit and all component sections shall be properly supported and vibration isolated.

C. When unit has been used during the construction period, the following shall be done prior to balancing and adjusting of system:

1. Permanent filters shall be washed as required to obtain clean condition and coated with proper adhesive.

2. Throwaway type filters shall be replaced with new. The Mechanical Contractor is responsible to provide and install new throwaway filters upon project's substantial completion. The Mechanical Contractor shall notify Owner's maintenance personnel prior to installation.

3.2 INSTALLATION

A. Verify that coils, filters, motors, drives and other components are matched with the proper unit.

B. Assemble unit components following manufacturer's instructions for handling, testing and operating. Repair damaged galvanized areas, and paint in accordance with manufacturer's written recommendations.

C. Vacuum clean interior of units prior to operation.

D. Repair air leaks from or into casing that can be heard or felt during normal operation.

E. Perform field mechanical balancing in accordance with Section 230950: TESTING AND BALANCING OF MECHANICAL SYSTEMS.

END OF SECTION 23 07 32

SECTION 23 07 34

HEAT RECOVERY ROOFTOP UNIT (POOLPAK UNIT)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

1.2 DESCRIPTION OF WORK

A. This Section includes all work necessary and/or required and all materials and equipment for construction of a complete system. Such work includes, but is not limited to the following:

1. Heat Recovery Rooftop Unit (PoolPak Unit)
2. Remote Condensing Unit

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

B. Media type air filters shall comply with U.L. Standard 900.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this section.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 230200.

B. Submit shop drawings and descriptive date for all equipment specified in this section.

1.6 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements. In addition, the following special guarantee applies:

1. Each compressor unit shall be provided with manufacturer's five (5) year warranty.

PART 2 – PRODUCTS

2.1 HEAT RECOVERY ROOFTOP UNIT (POOLPAK UNIT)

A. GENERAL

1. Provide where indicated, factory assembled, enclosed swimming pool environmental control / energy recovery system. System shall include mechanical heat recovery, supply and return / exhaust fans, outdoor, exhaust and recirculated air dampers, pool water heater, moisture disposal and complete solid state logic control system, factory installed and wired in a single unit enclosure.

2. The complete unit shall be listed by Underwriter Laboratories under the title of "Special Purpose Air Conditioners" and carry the appropriate label. Underwriter Laboratories listing shall not be required for units equipped with electric, gas or steam auxiliary heat; but these units shall be built in accordance with Underwriter Laboratories requirements.

3. The unit shall be specifically designed, manufactured and tested for enclosed swimming pool duty. Field assembled or modified standard commercial grade equipment is not acceptable. Complete unit shall be weatherproofed for outdoor installation.

4. Manufacturer shall have five years prior experience making similar equipment as described in this specification.

B. Principle of Operation:

1. The unit shall control space temperature and relative humidity, pool water temperature and shall provide controlled ventilation. Warm moist air from the natatorium is drawn over an evaporator coil by the return fan; and the latent and sensible heat is removed from the air. The heat captured by this process and the heat generated from the compressor power consumption are absorbed by a mechanical refrigeration system. The resulting dryer, cooler air is blown into a mixing box. The unit shall include an automatic economizer control function in which the system logic determines what portion, if any, of the "leaving evaporator" air to exhaust from the mixing box and replace with an equal amount of outside air. The selected exhaust air quantity is that which will result in the least electrical power consumption by the unit, based upon a comparison of outside air temperature and humidity, return air temperature and humidity and "leaving evaporator" air temperature and humidity. The air from the mixing box is drawn over a condenser coil and optional auxiliary heating coil by a supply fan.

2. The refrigeration system is activated if either the space temperature deviates from or the relative humidity rises above its setpoint.

3. The unit shall monitor space and outdoor temperature and relative humidity, pool water temperature and building wall temperature.

4. The thermal energy absorbed by the refrigeration system is distributed as follows:

(1) First priority is given to maintaining the natatorium space temperature. No supplementary space heating system external to the unit is required.

(2) Second priority is given to maintaining pool water temperature.

C. Unit Casing:

1. All panel work and structural steel members shall be of galvanized steel, treated and painted after fabrication but prior to assembly to provide a chlorine and pool chemical resistant finish. The paint shall be plastic epoxy based powder coating, applied .003 inch (2-3 mils) thick, and baked and bonded at 420°F until it forms a hard vinyl textured surface.

2. Structural steel frame shall be 3/16 inch steel channel base with 3/16 inch steel cross bracing. Vertical support posts for removable panels shall be formed from 16 gauge galvanized steel and painted. All nuts, bolts and lock washers shall be Cadmium plated. All sheet metal screws shall be Empigard coated galvanized steel.

3. Top panels and removable side panels shall be formed from 18 gauge galvanized steel. Access panels shall be secured by two or more key operated latches. All side panels shall be insulated with minimum one inch duct liner insulation secured to panels by adhesive and panel flanges. The insulation shall be approved for 350°F operating temperature. The fire resistance rating shall conform to NFPA Standard 90A and 90B. The thermal conductivity shall not exceed 0.29 BTU/hr/F/sq. ft/in at 75°F. All seams shall be bolted and sealed to prevent leaks. The roof shall be gasketed and secured to frame with Empigard coated zinc treated screws. All nuts, bolts and lock washers exposed to the natatorium air shall be Cadmium plated. All sheet metal screws exposed to the natatorium air shall be Empigard coated galvanized steel.

4. Compressors, pool water heat recovery unit, and controls, including solenoid and expansion valves and refrigerant sight glasses shall be located in compartments isolated from unit air stream.

5. The unit shall be equipped with two factory mounted terminal blocks, for dual power supply connections, one for the fan and control transformer circuit and one for compressor circuit. The terminal blocks shall be suitable for copper conductors only.

6. Heavy duty wire guards on condenser coil and fan discharge.

D. Compressor:

1. The dehumidifier shall utilize a heavy duty industrial semi-hermetic compressor(s) with a total of 3 stages serviceable type with suction gas cooled motor equipped with internal solid state sensor thermal protection, service valves, easily removable external crankcase heater for liquid migration protection, pumpdown cycle protection and oil failure protection.

2. Capacity control shall be electro-hydraulic, allowing reduced load starting and variable load operation. Capacity control through hot gas by-pass is absolutely not permissible. Forced feed lubrication system shall include self-priming, positive displacement, replaceable oil pump, oil strainer, sight glass and crankcase oil heater. The compressor shall use ring plate

suction valves and "discus puck" type discharge valves, large diameter, high strength modular cast iron crank shaft.

E. Pool Water Heater:

1. Water heater shall be capable of rejecting all the heat recovered from the compressor and the heat recovered in the evaporator.

2. Pool water heater shall be counter flow, tube-in-tube type. Water side shall be Type L, cupro-nickel. Pool water heater shall be insulated with minimum 1/2 inch closed cell foam. If dehumidifier is located outdoors, pool water condenser shall be equipped with self-regulating electric heat tape for freeze protection.

3. Pool water condenser shall be a vented double wall with removable heads for inspection and cleaning.

4. Pool water heating is controlled by a refrigerant solenoid valve which directs hot refrigerant gas into the pool water heater on a call from the control system. Water circuit shall be applied with CPVC pipe stub-outs. Copper tubing and/or fittings in the pool water circuit shall be unacceptable.

F. Evaporator Coil:

1. Coil shall be constructed of copper tubes, .006 inch thick, copper fins with copper end sheets,frame and intermediate supports. All nuts, bolts and lock washers shall be cadmium plated. All sheet metal screws shall be Empigard coated galvanized steel. Coil construction of dissimilar metals such as copper / aluminum / galvanized steel / stainless steel or plastic / vinyl coated coils shall not be acceptable.

2. All tubes shall be expanded into fin collars. All joints shall be brazed. The coil shall be tested to 320 PSIG while submerged in water. All brazing shall be done with nitrogen gas inside tubes to give clean internal surfaces. The coil shall be dried and sealed. Its inside shall be commercially free of oxides and foreign matter. Coil assembly shall be 1600 PSIG ultimate strength.

3. The coil shall be sectioned to provide proportional air-to-refrigerant latent and sensible heat removal capacity. This capacity modulation shall be accomplished by utilizing multiple thermal expansion valves (TXV) for the evaporator. Each TXV shall be equipped with a refrigerant flow control solenoid valve and refrigerant sight glass.

G. Remote Condensing Unit

1. General:

a. Furnish air-cooled condensing unit in accordance with the performance schedule shown on the plans.

b. Install them as shown on the plans in accordance with:

- The manufacturer's recommendations and
- All applicable national and local codes.

c. UL (CSA) approved.

d. Completely assembled for one-piece shipping and rigging.

e. Leak, pressure and functionally tested at the factory to assure a trouble-free start-up after installation.

f. In current production with published literature available to check performance, limitations, specifications, power requirements, dimensions, operation and appearance.

2. Unit Enclosure:

a. A steel angle frame to provide the rigid support required for shipping, rigging and years of dependable operation.

b. Exterior panels of 18-gauge galvanized sheet steel which have been bonderized and finished with baked enamel to provide a long-lasting quality appearance.

c. Removable panels to provide easy access to all internal components for maintenance, service and adjustment.

3. Each compressor shall be mounted on spring isolators and shall be enclosed in a separate compartment to minimize the transmission of sound and vibration.

4. Condenser Coils:

a. Shall be draw-thru, with manufacturer’s standard wire guards.

b. Shall be constructed of copper tubes arranged in staggered rows and mechanically expanded into aluminum fins, and

c. Shall have a separate circuit which will provide at least 19 degrees F of liquid sub-cooling at design conditions.

5. Condenser Fan Motors:

a. Shall be directly connected to the condenser fans,

b. Shall have permanently lubricated ball bearings, and

c. Shall have inherent overload protection.

d. Motors shall be of the permanent split-capacitor type.

e. Condenser fans shall be arranged for vertical discharge of the condenser air, with manufacturer's standard wire guards.

6. The wiring for each unit shall include:

a. A crankcase heater (one per compressor).

b. A 24-volt temperature control circuit.

c. High and low pressure circuits.

d. Condenser fan motor controls to assure stable operation of ambient temperatures down to 0 degrees F.

e. Condenser fan and compressor contactors factory wired to pressure lugs or terminal block for power wiring.

7. The refrigerant piping for each system shall include:

a. A strainer-drier; the strainer-drier and sight glass may be shipped separately for field installation.

b. A moisture indicating sight glass, and

c. Service access valves.

H. Auxiliary Air Heating: The auxiliary air heating shall be provided by two factory mounted, and wired indirect gas fired furnaces. Field installed duct furnaces shall not be acceptable. Unit mounted gas furnaces shall be constructed with 409 stainless steel primary and secondary heat exchangers, spark-ignited intermittent safety pilot with electronic flame supervision, two stage controls, fan control, high limit safety cutout.

I. Air Filters: The evaporator and condenser coil shall each be protected with a separate upstream air filter system. The filters shall be 2 inch thick, multigraduated, laminated polyester construction, throwaway type. The filters shall have a non-migrating tackifier encapsulated between the second and third laminates. They shall be totally non-toxic, non-allergenic and not support the growth of bacteria and fungus.

J. Mixing Box: The mixing box shall be integral to the unit and physically located between the evaporator and condenser coils. The mixing box shall be equipped with three dampers to control the amount of exhaust, outside and recirculated air. The exhaust damper shall be downstream of the evaporator coil to allow full heat reclaim prior to exhaust of the air. The air condenser coil shall be located downstream of the outside air intake to allow utilization of outside air when available or necessary.

K. Louvers:

1. If the dehumidifier is located outdoors, the dehumidifier shall be equipped with a louver and bird screen for both the outside air and exhaust air dampers.

2. The louvers shall be constructed so as not to reduce the face area of the dampers. The louver and bird screen construction and paint shall be the same as for the dehumidifier casing. The louver and bird screen shall be factory installed.

L. Dampers: Air mixing compartment shall be provided with opposed blade, less than 1% leakage, neoprene tipped, anodized aluminum air foil cross section dampers. Each damper section shall be operated by a separate motor factory mounted and wired into unit control panel; and be capable of modulating the dampers from 0% to 100%.

M. Supply Fan and Return Fan: The units shall be factory equipped with a supply fan and a return fan. These fans shall be multi V-belt driven, double inlet centrifugal type with multiblade forward curved wheels. Construction shall be galvanized steel, painted and baked with an epoxy coating providing a chlorine and pool chemistry resistant finish. The fans shall be dynamically and statically balanced and tested on the shafts. Fan bearings shall be grease lubricated, self-aligning ball bearings selected for 200,000 hours average life.

N. Fan Motors: Fan motors shall be induction type, totally enclosed fan cooled with Class F insulation, prelubricated ball bearings and shall be mounted on an adjustable base. Motor to be U.L. listed. Supply and return fan motors shall each be provided with individual factory mounted and wired motor starters.

O. Drain Pan:

1. The floor of each air side section shall be fabricated to be a drain pan. Each drain pan shall be constructed of galvanized steel and powder coat painted after fabrication with a protective coating providing a chlorine and pool chemistry resistant finish. Drain pans shall be fully insulated and piped to a common drain accessible from either side of the unit.

2. If the unit is located outdoors all drain lines within the unit shall be insulated with minimum 3/4 inch closed cell foam with self-regulating electric heat tape for freeze protection.

P. Refrigeration Circuit: The refrigeration system shall include a replaceable core liquid line filter dryer, liquid receiver, thermostatic expansion valves, pumpdown solenoid valves, two manual valves to isolate filter drier for fast drier core replacement and manual valves to isolate the liquid receiver. Suction lines shall be fully insulated with closed cell foam insulation. High and low pressure controls and refrigeration service access valves shall be located outside of the air stream. All refrigerant piping shall be copper Type L and is in accordance with "BOCA STANDARDS" ASTM B 88 for Copper Tubing, and M-702.0 for Joints and Connections.

Q. Control Panel:

1. The controller shall be micro computer based, The following functions / setpoints shall be programmable at the panel:

   a. Air Temperature
   b. Relative Humidity
   c. Pool Water Temperature

d. Occupied / Unoccupied Schedule
e. Damper Positions

2. The following LCD readouts and / or annunciation lights shall be provided:

a. Power On
b. Space Temperature
c. Space Relative Humidity
d. Pool Water Temperature
e. Pool Water Flow
f. Wall Condensation Prevention Temperature
g. Outside Air Temperature
h. Outside Air Relative Humidity
i. Supply Air Temperature
j. Damper Position
k. Compressor(s) Circuit Fault
l. Compressor(s) in Pumpdown
m. First Stage of Compressor(s) On
n. Second Stage of Compressor(s) On
o. Third Stage of Compressor(s) On
p. Unit in Air Heating Mode
q. Unit in Dehumidifying Mode
r. Auxiliary Air Heating Coil On
s. Pool Water Heating On
t. Time of Day / Day of Week

3. Control panel shall be integral to the unit and located in a separate compartment isolated from air flow. Compressors shall be equipped with contactors. Blower motors shall be equipped with motor starters and protected with adjustable magnetic trip overloads. Dry contacts shall be provided for alarm and fan interlock. Power block terminals shall be provided for different wire size connections. Wire shall be numbered and color coded for ease of trouble-shooting. Compressor shall have an anti-recycle timer to prevent short cycling.

4. The memory of the micro-computer control panel shall have a fault code history log. This fault code history log shall record the last 50 fault codes in the order of their occurrence. Each fault code shall be recorded along with the date and time it occurred. This fault code history log shall be accessible at the control panel, and, for so equipped units, at the remote panel and/or via modem and phone lines.

5. The dehumidifier control panel shall be capable of being remotely accessed via modem.

6. All wiring and electrical controls shall be done and installed in accordance with BOCA STANDARD M407.1.

7. The controls shall continuously monitor the 3-phase power lines for abnormal conditions and detect phase loss even when regenerated voltage is present. The device consists of a solid-state voltage and phase-angle sensing circuit driving an electromechanical relay. When correct voltage and phase rotation are applied, the internal relay will energize. A fault

condition shall de-energize the relay; when the fault is corrected the device shall automatically reset.

8. Remote Control Panel: The dehumidifier shall be remotely monitored and controlled. All setpoints and monitoring functions listed in **CONTROL PANEL section** shall be capable of being remotely controlled and monitored from the remote terminal and simultaneously at the dehumidifier control panel. Remote monitoring and controlling shall be accomplished by a remote CRT with keyboard (provided by the dehumidifier manufacturer) and via an auto-answer, 1200 BAUD modem (by dehumidifier manufacturer) and an electronic data transmission quality telephone line located at the remote terminal location (by owner). The remote terminal will be linked to the dehumidifier control system by a shielded 2 wire cable (18 gauge) standard copper up to 2000 feet (by dehumidifier manufacturer).

R. Control Sensors:

1. The unit shall be provided with the following factory mounted and wired control sensors:

   a. Space Dry Bulb Temperature
   b. Space Relative Humidity
   c. Air-Leaving-Evaporator Dry Bulb Temperature
   d. Air-Leaving-Evaporator Relative Humidity
   e. Pool Water Temperature
   f. Supply Air Dry Bulb Temperature

2. The unit shall be delivered with the following factory supplied sensors to be installed in the field by the unit manufacturer:

   a. Outside Air Dry Bulb Temperature
   b. Outside Air Relative Humidity
   c. Natatorium Wall Condensation Prevention Temperature Sensor

S. Environmental Logic Controls:

1. All operating and logic controls shall be factory mounted and wired in the unit. Control sequences shall be designed specifically to control swimming pool environmental conditions by the unit manufacturers.

2. At a minimum, control system shall provide full modulation of heat recovery / heating system by proportional control of dry bulb temperature, relative humidity, cold-wall surface condensation prevention humidity reset and ventilation air volume.

3. Controls shall automatically operate heating, dehumidification and heat recovery system in response to greatest requirement and adjust unit outputs to maintain building conditions. Unit and controls shall be capable of providing full heating capacity to either air or water. Controls shall be capable of proportional control of heating and dehumidification by loading stages of compressor capacity as necessary. As building requirements are satisfied, unit shall unload and shut off. At a minimum, unit shall provide the following functions:

a. Economizer/Ventilation: Providing outdoor air ventilation as a function of indoor and outdoor conditions. The economizer shall operate in either the space heating, space cooling, space heating and dehumidification or space cooling and dehumidification mode.

b. Occupied / Unoccupied Control Mode: Time clock for 7-day, 24-hour operation controlling the unoccupied mode operation during heating season. During unoccupied times the outside air and exhaust dampers stay in closed position to minimize the air heating load.

c. Space Heating: Full proportional control of space dry bulb temperature by staging compressor loading of unit capacity, with humidity override. Automatic mechanical heat recovery from pool room return air as required by building and / or water temperature. Return / exhaust air must pass through mechanical heat recovery system and shall be exhausted at its lowest heat content. Automatic switching and three (3) stage outputs for control of auxiliary air heating coil shall be performed.

Condition	**Action**
At Setpoint	Ventilation
At a drop from setpoint	Economizer if outdoor temperature is higher than return air.
At further drop from setpoint	Valve directing hot gas to air condenser energized. First and successive stages of compressor energized. Smart Economizer

Auxiliary air heating shall be controlled in two (2) stages as follows:

1st stage: energize gas furnace(s) on low fire
2nd stage: energize gas furnace(s) on high fire

d. Smart Economizer: The Smart Economizer is the simultaneous operation of the Heat Recovery Heating and Economizer modes.

Condition	**Action**
Natatorium requires dehumidification and/or heating and the outside air dry bulb and dew point are warmer and dryer, respectively, than	100% of the air from the evaporator is exhausted. 100% warm dry air is drawn into the PoolPak with its supply fan. The warm dry outside air is heated further as it passes over the condenser coil and supplied to

the air off the evaporator coil	the natatorium.

e. Pool Water Heating: If the space temperature is at or above setpoint and the pool water temperature is below the setpoint, hot gas is directed to the pool water condenser when the compressor is running. At other times the pool water requires heat, the PoolPak activates the main pool water heater.

f. Humidity Control The economizer is activated if dehumidification is required and:

   a. the air and water temperatures are satisfied, and
   b. the absolute humidity of the outside air is lower than the absolute humidity of the pool room air, and
   c. the outside air temperature will not adversely effect the pool room air temperature.

   If outside air cannot be used for dehumidification, then full proportional control of relative humidity is done by staging unit capacity. Humidity controller energizes the compressor and directs hot gas to the air condenser if space needs heating or water condenser if pool water temperature is below setpoint.

   If dehumidification is required and the air and water temperatures are satisfied and the outside air cannot be used to dehumidify the pool room and Flywheel Air Conditioning is not enabled, then the hot gas is directed to the external air cooled condenser, chilled water or cooling tower condenser or the auxiliary chilled water coil is activated, if so equipped.

Condition	**Action**
At Setpoint	Ventilation
At a rise from setpoint	Economizer if outdoor dew point is lower than return air dew point.
At further rise from setpoint	Valve directing hot gas to air condenser, pool condenser or ext. air-cooled condenser energized. First and successive stages of compressor energized. Smart Economizer

g. Condensate On Walls: When the temperature of the interior surface at the wall sensor drops to within 5°F of the dew point temperature of the space air, the relative humidity setpoint is offset downward. This condition causes the dehumidifier system to activate humidity control lowering the space dew point and hinders the formation of condensation on the cold wall surfaces.

h. Air Conditioning: Flywheel Air Conditioning

(1) This air conditioning control strategy uses the thermal storage capacity of the swimming pool. During occupied times the PoolPak cools the Natatorium air by removing the sensible and latent heat from the air in the evaporator. This heat is put into the pool water. The pool water's temperature is allowed to rise a maximum of 2°F above its normal setpoint. Automatic staging of cooling capacity is in response to air conditioning load.

(2) During the unoccupied time, if the pool water is above its setpoint, full ventilation is used to evaporatively cool the pool. This mode of operation continues until either the pool water goes 1° F below its setpoint or an occupied period starts.

(3) The changeover from heating to air conditioning as a function of dry bulb cooling demand in the Natatorium is automatic. A normal changeover deadband of 1.5°F between heating and cooling is used.

(4) This cycle is repeated as long as the requirement to provide air conditioning during the occupied periods exists.

T. Operating and Safety Controls:

1. Each unit shall be provided with a complete operating and safety logic control system. The control system shall shut down the compressor in case of high refrigerant pressure, low refrigerant pressure, oil failure, and / or high motor temperature conditions. The complete unit (fans & compressor) shall be shut down to protect the motors if power line abnormalities occur.

2. Operating and safety control system shall include all relays, contactors, sensors and switches necessary to operate complete unit.

U. Manufacturer:

1. Unit shall be base PoolPak, Inc. - PoolPak SWHP 100. Moisture removal rate shall be a minimum of 118 pound/hr.

V. Installation:

1. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

2. Install unit where shown on drawings. Provide three feet clearance around sides and four feet around compressor compartment of unit for air flow and service.

3. Provide and install all water piping, drains and controls for proper operation of unit.

W. Start-Up:

1. Start-up service shall be provided by the equipment manufacturer's authorized representative and shall include complete testing of all controls and unit operation. The agency responsible for start-up shall record the refrigeration pressures and electrical operating data. Copies of this data are to be supplied to the owner.

2. All units shall be thoroughly cleaned by the installing contractor in accordance with the manufacturer's instructions prior to being placed into service.

3. A complete operating and maintenance manual, including wiring diagrams, start-up and operating sequence and material list shall be provided to the owner.

4. The owner shall be provided with complete instruction of operating and maintenance procedures.

X. Warranty:

1. One year parts and material and labor warranty on the entire unit.

2. Drive Line Warranty - A four year extended parts warranty shall be provided on the:

   a. Compressors
   b. Compressor Motor Contactors
   c. Return Fan Motor
   d. Return Fan Motor Starters
   e. Supply Fan Motor
   f. Supply Fan Motor Starters
   g. Pool Water Condenser
   h. Pool Water Condenser Solenoid Valves & Coils
   i. Liquid Expansion Solenoid Valves & Coils
   j. Air Condenser Solenoid Valves & Coils
   k. Blowers, Wheels & Housings

3. A nine year extended parts warranty shall be provided on the all-copper evaporator, condenser and auxiliary hot water heating coils.

4. These warranties are contingent on proper maintenance of pool water chemistry including a pH of between 7.2 to 7.6, Free Chlorine not exceeding 2.0 ppm and Combined Chlorine not to exceed 0.5 ppm. These parameters are to be measured and recorded daily and be available for review upon request.

5. AutoGuard Service - For units equipped with a modem and phone line, the manufacturer shall call the unit once a week for the first two years and down load the fault code history log as well as review the performance and status of the unit. If a problem is detected, the manufacturer's service department shall call the owner's representative to further diagnose and solve the problem.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which equipment is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

B. Install in accordance with manufacturer's recommendations. Unit and all component sections shall be properly supported and vibration isolated.

C. When unit has been used during the construction period, the following shall be done prior to balancing and adjusting of system:

1. Permanent filters shall be washed as required to obtain clean condition and coated with proper adhesive.

2. Throwaway type filters shall be replaced with new. The Mechanical Contractor is responsible to provide and install new throwaway filters upon project's substantial completion. The Mechanical Contractor shall notify Owner's maintenance personnel prior to installation.

3.2 INSTALLATION

A. Verify that coils, filters, motors, drives and other components are matched with the proper unit.

B. Assemble unit components following manufacturer's instructions for handling, testing and operating. Repair damaged galvanized areas, and paint in accordance with manufacturer's written recommendations.

C. Vacuum clean interior of units prior to operation.

D. Repair air leaks from or into casing that can be heard or felt during normal operation.

E. Perform field mechanical balancing in accordance with Section 230950: TESTING AND BALANCING OF MECHANICAL SYSTEMS.

F. The Mechanical Contractor shall own as a part of his work, the following:

Provide one (1) additional drive set, if necessary, to obtain final design balancing requirements. The Mechanical Contractor shall coordinate with Balancing Firm and equipment manufacturer for drive selection, including belts and pulleys.

END OF SECTION 23 07 34

SECTION 230760

AIR HANDLING EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the contract, including the conditions of the contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the work specified in this section.

B. Refer to Section 230200 for HVAC General Provisions

C. Refer to Section 230210 for HVAC Basic Materials & Methods.

D. Refer to Section 230450 for Refrigeration Equipment – HVAC.

1.2 DESCRIPTION OF WORK

A. This Section includes work necessary and/or required and materials and equipment for construction of a complete system. Such work includes, but is not limited to the following:

1. Packaged Rooftop HVAC Unit with Energy Recovery (Aaon)

1.3 REFERENCE STANDARDS

A. Refer to Section 230200 for a general description of requirements applying to this section.

B. AMCA Standards 210 and 300 for fans.

C. ARI Standard 410, ASHRAE Standard 33 for Heating and Cooling Coils.

D. ASHRAE Standard 52.2 and U.L. Standard 900 for media type air filters.

E. AMCA Standard 511 and 500D for Air Control Dampers.

F. AMCA Standard 611 and 610 for air flow measurement stations.

G. ARI Standard 1060 and ASHRAE Standard 84 for Air-to-Air Energy Recovery Equipment.

H. ARI Standard 260 and 430 for Air Handling Units.

1.4 QUALITY ASSURANCE

A. Refer to Section 230210 for a general description of requirements applying to this Section.

B. Whenever a variable frequency PWM drive is installed to control an AC motor, a maintenance-free, circumferential, conductive micro fiber shaft grounding ring shall be installed on the AC

motor drive end to discharge shaft currents to ground. Recommended part: AEGIS SGR™ Bearing Protection Ring, as made by Electro Static Technology. Install in accordance with the manufacturer's written instructions.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 230200.

B. Submit shop drawings and descriptive date for all equipment specified in this section.

1.6 SUBSTITUTIONS

A. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents. This shall include, but not limited to, space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items provided by other trades. If the manufacturer or related bidding contractor does not comply with these requirements, this Contractor shall be responsible for any and all additional costs associated with the changes required by other trades.

1.7 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, General Requirements. In addition, the following special guarantee applies:

1. Each compressor unit shall be provided with manufacturer's five (5) year parts and labor warranty.

PART 2 – PRODUCTS

2.1 PACKAGED ROOFTOP HVAC UNIT WITH ENERGY RECOVERY

A. Factory fabricated and assembled unit consisting of constant volume fans, motors, and drive assemblies, coils, plenum casing, filters, energy recovery wheel (with motor and drive), natural gas heating section, access doors and operating controls, motor starters and disconnect switches.

1. Unit cooling capacities shall be in accordance with and tested to ARI standard 210/240-84 & 360-85.

2. Units shall be safety certified in accordance with UL standard UL465, UL559 and/or ANSI Standard Z21.47. Unit shall be safety certified by an accredited testing laboratory. Unit nameplate shall carry the sticker of the certification agency.

3. Unit shall be shipped completely assembled by the manufacturer including all standard items and optional items. Unit shall be 100% run tested by the manufacturer with a copy of the run test report shipped with the unit.

4. Unit shall have decals and tags to indicate unit lifting - rigging, service areas and caution areas. Wiring diagrams, installation and maintenance manuals shall be supplied with each unit.

B. Unit Construction:

1. Unit shall be completely factory assembled, piped and wired, and shipped in one piece, specifically designed for outdoor application with a fully weatherproof cabinet with dedicated bottom supply/return air style system for mounting on an insulated curb. Cabinet shall be constructed entirely of G90 galvanized metal with the exterior constructed of 18 gauge or heavier material. The unit roof shall be cross broken and sloped to assure drainage.

2. Access to compressor(s), controls, filters, blower, heating section, and other items shall be through hinged access doors with a quarter turn latch (door fastening screws are not acceptable). Air side service access doors shall be fully gasketed with rain break overhangs. Filter access door will have an internal metal liner to protect the doors insulation.

3. Unit exterior shall be painted with corrosion resistant polyurethane paint over a wash primer and a paint lock type galvanized steel. Paint shall be manufacturer's standard color and withstand a **2**,500 hour salt spray test. The interior air side of the cabinet shall be entirely insulated on all exterior panels with 1" thick, three quarter pound density, neoprene coated, fiberglass insulation.

4. To guarantee no leakage of conditioned air from the cabinet all of the cabinet under positive pressure, downstream from the supply air blower, shall have a separate internal cabinet contained within, and separate from, the exterior cabinet by an air gap. The internal cabinet shall be guaranteed to hold a static pressure of up to 12 inches water column.

5. All openings through the base pan of the unit shall have turned flanges of at least 1/2" in height around the opening through the base pan.

6. Condenser coils and fan discharge shall be protected by heavy duty wire guards.

C. Fans:

1. Blower(s) shall be entirely self contained on a slide deck for service and removal from the cabinet. Adjustable V-belt drive shall be provided with a minimum rating of 140% of the motor nameplate brake horsepower. Blowers, drives and motors shall be statically and dynamically balanced. Blower shall be single width, single inlet airfoil design.

   a. Blower shall be controlled by a factory mounted VFD where indicated.

2. Shafts shall be AISI hot rolled steel accurately turned, ground, polished, and ring gauged for accuracy. Shafts shall be sized for first critical speed of at least 1.43 times the maximum speed for the class.

3. Bearings shall be heavy duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type and selected for minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum class RPM.

4. Fans shall be mounted on vibration bases with adjustable motor bases, V-belt drives, spring isolators, and flexible connections. Belts shall be designed for a minimum 1.4 service factor. Drives for motors shall be variable pitch.

5. Motors shall be standard NEMA frame, high efficiency, with 1.15 service factor and open drip-proof enclosures. Motor selections shall be non-overloading over the fan curve from 0 to 150% of design flow, and the design BHP shall not be above 90% of motor horsepower at design condition.

6. Fans' ratings shall be based on AMCA Standards 210 and 300. Fans shall bear the AMCA seal.

D. Outside Air Economizer

1. CO_2 Controls: Unit shall be equipped with CO_2 sensors to modulate outside air. The economizer shall consist of a motor-operated outdoor air damper and return air damper constructed of extruded aluminum, hollow core, air foil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 25 CFM of leakage per square foot of damper area when subjected to 2" WG air pressure differential across the damper. Damper motor shall be spring return to ensure closing of outdoor air damper during periods of unit shutdown or power failure.

E. Energy Recovery Wheel:

1. Units shall be furnished with a factory mounted and tested energy wheel. The wheel shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seals and bearings. These components will form a cassette which shall be removable from the unit without the use of tools.

2. The energy recovery cassette shall contain a total energy recovery heat wheel constructed of a light weight polymer material with permanently bonded desiccant coating. The energy recovery wheel media shall be capable of removal from the cassette and replacement without the use of tools. Wheel media shall be cleanable using hot water or light detergent without degrading the latent efficiency.

3. The exhaust fan shall be forward curved or backward inclined DWDI with an adjustable V-belt drive. A backdraft damper shall be included with the exhaust fan.

4. The energy wheel section shall include a through-matrix purge section factory installed onto the energy wheel. The purge section shall include dampers, actuators and casing components.

5. The energy recovery wheel shall include wheel rotation detection sensor and speed switch output module with contacts wired to the low voltage terminal block for wheel rotation indication.

F. Condenser Section

1. The condensing section shall be equipped with direct drive, vertical discharge condenser fan(s). The condenser coil shall be sloped at least 30° from horizontal to protect the coil from damage.

2. Condenser coil(s) shall be copper tube with aluminum fins mechanically bonded to the tubes.

3. Condenser coil(s) to be sized for a minimum of 10° sub-cooling.

G. Evaporator Coil

1. Evaporator coil shall be multi-row minimum ½" copper tube with aluminum fins mechanically bonded to the tubes, with galvanized steel end casings, and equalizing type vertical tube distributors.

2. Evaporator coils for multi-compressor units shall be circuited with one circuit and expansion valve per compressor.

3. Unit shall be equipped with a double sloped, mastic coated drain pan, and outlets on either side of unit.

H. Refrigeration System

1. Compressor(s) shall be of the scroll type with crankcase heater(s), internal thermal overload protection, internal spring isolators and mounted on the compressor manufacturer recommended rubber vibration isolators.

2. All units over 7 tons shall be multiple stage and shall have a minimum of 2 stages of capacity control.

3. Compressor(s) shall be mounted in an isolated compartment to permit operation of the unit without affecting air flow when the compressor compartment is open.

4. Compressor(s) shall be isolated from the base pan and supply air to avoid any transmission of noise from the compressor into the building.

5. System shall be equipped with thermostatic expansion valve(s) type refrigerant flow control, automatic re-set low pressure and manual reset high pressure refrigerant controls, Schrader type service fittings on both the high side and low pressure sides of the system, refrigerant liquid line driers, and factory charged with refrigerant.

6. Unit shall be equipped with five minute time delay and twenty second staging relays, and hot gas bypass no-load valves and piping for each refrigerant circuit.

I. Gas Heating Section:

1. Unit shall be equipped with a fully modulating heating section using natural gas fuel, minimum 4 to 1 turndown.

2. Unit shall be provided with a gas heating furnace consisting of an aluminized steel or stainless steel tubular heat exchanger, an induced draft blower, and an electric pressure switch to lock out the gas valve until the combustion chamber is purged and combustion air flow is established.

3. Unit shall be provided with a gas ignition system consisting of an electronic ignitor to a pilot system, which will be continuous when the heater is operating, but will shut off the pilot when heating is not required.

4. Unit shall have gas supply piping entrances in the unit base for through the curb gas piping and in the outside cabinet wall for across the roof gas piping.

5. Units tubular heat exchanger shall carry a twenty-five (25) year warranty.

J. Power/Electrical Section

1. Unit shall be equipped with a single point electrical connection with motor starters, relays, voltage transformer and terminal block for controls interface, factory mounted disconnect switch**.**

2. Unit shall include a laminated, color coded electrical wiring diagram attached to the door of the unit. Damper actuators shall be wired to the units low voltage terminal block. All components are UL listed, approved, or classified.

K. Filters

1. Unit shall be furnished with 2", MERV 8 per ASHRAE Standard 52.2-99, pleated throw away supply air filters, U.L. Class 2.

2. Units with energy recovery wheels shall have outside air and mixed air filter sections.

L. Roof Curbs

1. Curb shall be constructed of 14 gauge galvanized steel with a wood nailer strip. Curbs are to be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit. Curb shall allow for horizontal duct connections.

M. Manufacturers: Basis of design AAON. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work are limited to one of the following:

1. AAON
2. Addison
3. McQuay

N. Any listed equivalent manufacturer and the Mechanical Contractor shall be completely responsible to comply with all requirements as indicated on the contract documents. This shall

include, but not be limited to, space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which equipment is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.

B. Install in accordance with manufacturer's recommendations. Unit and all component sections shall be properly supported and vibration isolated.

3.2 INSTALLATION

A. Verify that coils, filters, motors, drives and other components are matched with the proper unit.

B. Assemble unit components following manufacturer's instructions for handling, testing and operation. Repair damaged galvanized areas, and paint in accordance with manufacturer's written recommendations.

C. Vacuum clean interior of units prior to operation.

D. Repair air leaks from or into casing that can be heard or felt during normal operation.

E. Install rooftop units in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.

F. Support: Install and secure roof curb to roof structure, in accordance with National Roofing Contractor's Association (NRCA) installation recommendations and shop drawings. Install and secure rooftop units on curbs and coordinate roof penetrations and flashing.

G. Perform field mechanical balancing in accordance with Section 230950: TESTING AND BALANCING OF MECHANICAL SYSTEMS.

H. The Mechanical Contractor shall own as part of his work, the following:

Provide one (1) additional drive set, if necessary, to obtain final design balancing requirements. The Mechanical Contractor shall coordinate with Balancing Firm and equipment manufacturer for drive selection, including belts and pulleys.

3.3 AUTOMATIC TEMPERATURE CONTROLS

A. Coordination of control work with the BAS shall include, but not be limited to, the following items as described in Section 230900: ATC.

B. Constant volume rooftop units:

1. The following items shall be provided by the equipment manufacturer:

a. Motor starters and overload protection.
b. Control transformers.
c. Energy wheel motor, speed controller, defrost controller, rotation failure contact, and status contact.
d. Dampers and damper motors.
e. Terminal blocks for all wiring connections between equipment and control devices.
f. Analog air filter differential pressure sensor.
g. Manual reset freeze stat.
h. Variable frequency drives as scheduled.
i. Run status dry contact for each VFD.

2. The following items will be furnished by the BAS Contractor and installed by the equipment manufacturer:

   a. DDC Controller
   b. Discharge air temperature sensor.
   c. Discharge humidity sensor.
   d. Return air temperature sensor.
   e. Return air humidity sensor.
   f. Temperature sensor at exhaust air outlet.
   g. Current sensor for one phase of power feeding the supply fan, and unit exhaust fan.
   h. Mixed air average temperature sensor.
   i. Heating discharge air temperature.

3. The following items shall be field mounted and wired by the BAS Contractor:

   a. Discharge air temperature sensor.
   b. Discharge humidity sensor.
   c. Heating discharge air temperature sensor.
   d. Manual reset freezestat (supplied by ATC).

C. The factory mounted DDC controllers shall be fully programmed with factory approved applications. Any modifications to these programs shall be done by factory trained personal or as approved by the DDC controls and unit equipment manufacturer.

The unit equipment manufacturer shall provide coordination for start-up, check-out, and test of the factory mounted DDC controllers and network devices including the protocol translator. Any hardware and software necessary including labor shall be provided by the unit equipment manufacturer.

The unit DDC controllers shall be networked to a standard protocol translator or gateway so system points shall be available for communications and control from the Building Automation System (BAS)/Automatic Temperature Controls (ATC) System. The protocols available from the protocol translator to the BAS/ATC System shall be BACNET (MSTP), LON or N2.

System points shall be configured to the BAS/ATC System by the BAS/ATC System Contractor. The mapping of points to the BAS/ATC front-end/PC shall be done by the BAS/ATC Contractor. Any software or hardware necessary including labor to accomplish this work shall be provided by the BAS/ATC System Contractor.

END OF SECTION 230760

SECTION 23 09 00

AUTOMATIC TEMPERATURE CONTROL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Section 230200 and drawings are hereby made a part of this section as fully as if repeated herein.

B. The Mechanical Contractor shall coordinate with the work of Division 26 and the Fire Alarm System vendor for locations and mounting of all duct smoke detectors. These devices are shown on the Mechanical Drawings for reference only to show the intent of the work. All locations shall be determined based on approved shop drawings from the Fire Alarm System vendor and the Contractor for the work of Division 26, Electrical.

1.2 DESCRIPTION OF WORK

A. Provide labor, material and supervision necessary to install a complete direct digital control system of temperature controls to control all HVAC Systems, associated components and accessories as described herein.

1.3 SUBMITTALS

A. Submit shop drawings and manufacturer's data sheets of all equipment.

B. Submit manufacturer's certificates of conformance with applicable codes.

C. Furnish point-to-point diagram of automatic temperature control system approval, including heating, ventilating and air conditioning equipment wiring diagrams where temperature control connections are required.

D. Provide ten (10) copies of submittal data within thirty (30) days of contract award.

E. Submittal shall consist of:

1. System Architecture showing all digital and pneumatically actuated devices.

2. Equipment lists of all proposed devices and equipment including data sheets of all products.

3. Valve, damper and well and tap schedules showing size, configuration, capacity and location of all equipment.

4. Data entry forms for initial parameters. Contractor shall provide English listing of all analog points with columnar blanks for high and low warning limits and high and low alarm limits, and a listing of all fan systems with columnar blanks for beginning and end of occupancy periods; and samples of proposed text for points and messages (for at least two systems of at least 15 points total) including sample 480 character alarm message. All text shall be approved prior to data entry.

5. Wiring and piping interconnection diagrams including panel and device power and sources.

6. Sketches of all graphics.

1.4 QUALITY ASSURANCE

A. Insure that all work and equipment is installed in accordance with manufacturer's warranty requirements.

B. Provide adequate supervision of labor force to assure that all aspects of specifications are being fulfilled.

C. The system shall be engineered, programmed and installed by personnel trained and regularly employed by the control's manufacturer.

D. Supplier shall have technical support to promptly respond within 24 hours or less to service calls to the site with technical staff, spare parts inventory and test and diagnostic equipment.

E. Codes and Approvals:

1. The complete system installation shall be in strict accordance with national and local electrical codes. All devices designed for or used in line voltage applications shall be UL listed.

   a. All microprocessor based devices shall be UL916 listed.
   b. All electrical environmental control and monitoring devices shall be UL429 and/or UL873 listed.

2. All electronic equipment shall conform to the requirements of FCC regulation Class B, Part 15, Section 15 governing radio frequency electromagnetic interference and be so labeled.

3. The complete system shall conform to ANSI/ASHRAE Standard 135.95, BACNET.

F. All system components shall be designed and built to be fault tolerant.

1. Provide satisfactory operation without damage at 100% above and 85% below rated voltage and at +3 Hertz variation in line frequency.

2. Provide static, transient, and short circuit protection on all inputs and outputs. Communication lines shall be protected against incorrect wiring, static transients and induced magnetic interference. Bus connected devices shall be A.C. coupled or equivalent so that any single device failure will not disrupt or halt bus communication.

1.5 ELECTRICAL WIRING

A. All electrical wiring, components and accessories in connection with the Automatic Temperature Control System shall be furnished and installed by the control manufacturer.

1. Electrical Contractor shall provide all wiring to duct smoke detectors.

2. Unless stated otherwise in the design documents, the ATC Contractor is responsible for providing control power to all valves, actuators, devices and components within the DDC System regardless of the selected voltage of those devices. This also includes all 120 volt power circuits required for devices, panels and control equipment.

3. The ATC Contractor shall be responsible for providing the control interface between terminal unit condensate pumps and their respective units at the required voltage of these devices in order to shut down the terminal unit in the event of high water level in the condensate pump receiver.

B. Control wiring shall include all wiring necessary to interface with controls, such as relays and transducers, and shall also include electric and electronic devices such as freezestats, electronic sensors, relays, flow switches and controlled devices such as valve and damper operators. Pilot devices such as ON/OFF switches and thermostats installed in series with line voltage circuits shall be considered to be control wiring.

1.6 AUTOMATIC TEMPERATURE CONTROL

A. Provide an extension of the existing DDC System of automatic temperature control, manufactured by Alerton Technologies, Inc., as installed by Advanced Power Control, Inc.

B. All electrical wiring in connection with the installation of the automatic temperature control system shall be furnished and installed under the direct supervision of the control manufacturer.

PART 2 – PRODUCTS

2.1 SENSORS

A. Solid state room sensors shall be of the wire wound resistance type element. Sensor shall be equipped with visual readout and adjustment. Sensors shall be of the completely solid state type with no moving contacts. Printed circuit board under thermostat cover shall contain a low mass resistance type setpoint dial and amplifier. Provide test points for measuring output voltage. Sensors shall be direct or reverse acting as required for the sequence of operation.

B. Sensors shall provide the application for night setback override.

C. Sensors shall be mounted at ADA height (48” above floor).

2.2 SMOKE DETECTORS

A. Duct type ionization smoke detectors shall be furnished by the Electrical Contractor and installed by the Mechanical Contractor in the supply and return air stream. The Electrical Contractor shall provide wiring from each detector to the Fire Alarm System panel.

B. The Electrical Contractor shall provide an alarm output signal from the FAS panel to the BAS for unit shutdown.

2.3 ACTUATORS

A. Electronic actuators shall be sized to operate their appropriate dampers and valves with sufficient reserve power to provide smooth modulating action or two-position action as specified.

B. Provide integral, auxiliary switches for direct coupled actuators to indicate when a desired position is reached or to interface additional controls for a specific sequence.

C. Align actuator with drive shaft, provide permanent mark to identify closed position of end device.

2.4 SENSOR TRANSMITTERS

A. Duct and immersion sensors shall have minimum spans as required to meet the temperature requirements. Duct sensors shall have sensing elements of sufficient length and accuracy to measure average duct temperature in each location.

B. Sensors shall be of corrosion resistant construction, tamperproof, suitable for mounting on a vibrating surface. Exposed capillaries shall be temperature compensated, and armored or installed in protective tubing.

C. All sensing elements for water pipe mounting shall be of the rod and tube type with linear output and shall be furnished complete with separable protecting wells filled with heat conductive compound. Sensors shall be factory calibrated and tamperproof. If easily adjustable sensors are provided, they shall be located inside metal enclosures with cylinder lock and key to prevent unauthorized setting.

D. Safety Devices: Provide the following:

1. Low limit, electric type, with 20’ long serpentine element, with manual reset, set for 37°F for “freeze” protection and 55°F for fan discharge application, unless otherwise noted.

2. Air and water duty flow switches: Differential pressure type for fan and pump status.

2.5 CONTROL VALVES

A. Valves shall be rated for a minimum of 150 percent (150%) of system operating pressure at the valve location but not less than 125 psig.

B. 2" and Smaller: Valves shall be bronze body with screwed or flared connections.

C. 2½ " and Larger: Valves shall be bronze or iron body, flanged.

D. Flow characteristics:

1. Two-way valve position vs. flow relation shall be equal percentage for water flow control.

E. Maximum pressure drop through valve:

1. Modulating water flow control: ½ the pressure drop through the apparatus with maximum of 10 feet of water. Two position water valves shall be line size.

2.6 CONTROL DAMPERS

A. The ATC Sub-contractor shall furnish all the controlled dampers of the type and sizes indicated on the drawings for installation by the sheet metal Sub-contractor.

B. All 2-position control dampers shall be parallel blade and sized for minimum pressure drop, at the specified duct size.

C. All modulating dampers shall be opposed blade and sized for an effective linear air flow control characteristics within the angle of rotation and maximum pressure drops specified. Information shall be provided to the sheet metal Subcontractor for determining the proper duct reductions or baffles used.

D. Damper frames shall not be less than 16 gauge galvanized steel, formed with corner braces for extra strength, with mounting holes for enclosed duct mounting.

E. All damper blades shall be of not less than 16-gauge galvanized steel formed for strength and high velocity performance. Blades on all dampers must not be over 8" in width. Blades shall be secured to 1/2" diameter zinc plated axles by zinc plated bolts and nuts. All blade bearings shall be nylon or oilite. Blade side edges shall be sealed off against spring stainless steel seals. Teflon coated thrust bearings shall be provided at each end of every blade to minimize torque requirements and insure smooth operation. All blade leakage hardware shall be constructed of corrosion resistant, zinc plated steel and brass.

F. Dampers shall be suitable for operation between -40 and 200 degrees. The control manufacturer shall submit leakage and flow characteristics plus a size schedule for all controlled dampers.

G. All blade edges shall have inflatable seal edging that shall be rated for leakage less than 10 cubic feet per minute per square foot of damper area at a differential pressure of 4" of water when the damper is being held by a torque not to exceed 50 inert lbs. Leakage shall not exceed 1/2 of 1% of total flow.

H. Provide permanent mark or scribe end of drive shaft to align damper with actuator in closed position.

2.7 CONTROL CABINETS

A. Control cabinets shall be constructed of 18-gauge steel with locking hinged door. Unless otherwise specified, all controllers, electric relays, switches and other equipment furnished as part of the control system which are not required to be mounted on mechanical equipment, shall be cabinet mounted. The temperature indicators and switches shall be flush mounted on the door tagged with plastic labels. All electrical devices shall be wired to a numbered terminal strip and all devices shall be completely adjusted and checked for proper operation prior to shipment to job site. All wiring shall be numbered according to the control diagram.

2.8 SEQUENCE OF OPERATION

A. Elevator Machine Room Heat Pump Unit Control

1. The machine room is served by a packaged terminal unit PTHP-1.

2. Set the unit controller furnished with the unit to maintain space conditions at 75°F, adjustable.

3. Provide wall-mounted sensor to monitor space temperature and alarm the system whenever the space temperature is at or above 80°F, adjustable.

B. Toilet Room Exhaust Fan Control

1. The sequence that follows is for fan EF-1.

2. Provide motor-operated damper and actuator for control of exhaust air as shown on the drawings.

3. During the unoccupied mode, the exhaust air damper shall remain closed and the fan off.

4. During the occupied mode, the exhaust air damper shall open and, subject to a limit switch on the damper, the fan shall start and run continuously.

5. Interface with a common "Global" fire alarm input from the fire alarm system. The fire alarm contact shall be provided at the fire alarm panel by the fire alarm contractor. The status of the alarm contact shall be communicated throughout the BAS. When the fire alarm contact indicates an alarm condition, the BAS shall de-energize the fan and the damper motor shall spring return the exhaust air damper closed. Provide an alarm at the OWS to indicate fire alarm status.

6. Provide a current sensor on one leg of the power to the fan motor to monitor fan operation and alarm whenever the fan fails to operate once activated.

C. Natatorium HVAC Unit Control

1. This system consists of packaged unit, HRU-1, and remote air-cooled condenser ACC-1. The packaged unit consists of supply fan, return fan, DX cooling coil, auxiliary gas heat, energy recovery system, motor operated dampers and actuators for control of outside air and relief air. Interface with controls that are factory furnished and installed on the unit.

2. This system shall be controlled by its factory furnished DDC Controller. The DDC Controller shall be wired to all sensors furnished with the packaged unit and all other devices described in this sequence.

   a. Interface unit controls with the remote air-cooled condenser, ACC-1.
   b. Interface unit controls with wall mounted surface temperature sensor.
   c. Interface unit controls with remote interface panel in the pool director's office.

3. The equipment manufacturer shall provide wiring diagrams for the equipment.

4. Coordinate with all items provided by the equipment manufacturer as described in the equipment specifications.

5. HRU-1 shall be controlled by its factory mounted and tested control system as described in the equipment specifications.

6. This system shall include status and alarm contacts for the system. It shall include the ability to interface with the existing Alerton Controls BAS system for monitoring the condition and status of the unit.

7. During the programmed occupied mode, the supply fan and energy recovery system shall run continuously with the outside air damper open to its minimum scheduled position. The packaged controls on the unit shall sequence the heating and cooling components to maintain space conditions at nominal 85°F and 60% RH, adjustable. Surface temperature sensor installed in the space shall be used as input to the packaged controls to override space temperature to prevent frost on the perimeter wall surfaces of the pool enclosure.

8. During the programmed un-occupied mode, the outside air damper shall remain closed. Space conditions shall remain the same unless otherwise programmed at the discretion of the Owner.

9. The BAS shall interface with a common "Global" fire alarm input from the fire alarm system. The fire alarm contact shall be provided at the fire alarm panel by the fire alarm system vendor. The status of the alarm contact shall be communicated throughout the BAS. When the fire alarm contact indicates an alarm condition, the BAS shall de-energize all fans and damper motors. When de-energized, the damper motors shall spring return all dampers closed. Provide an alarm at the OWS to indicate fire alarm status.

10. Duct smoke detectors shall be installed in the supply and return air ducts at the unit as part of the work of Division 23. The detectors shall be furnished and wired to the fire alarm system as part of the work of Division 26. The duct smoke detectors shall alarm through the FAS, which shall provide a signal to the BAS to de-energize all fans and damper motors. When de-energized the damper motors shall spring return all dampers closed. When the smoke detectors trip, an alarm shall be generated at the OWS.

11. The BAS shall accommodate input from the unit's factory installed sensors for monitoring and alarm generation at the OWS.

D. Cabinet Unit Heater Control

1. The sequence that follows is typical for units CUH-1 and CUH-2. Each cabinet unit heater shall be controlled by the BAS via a space temperature sensor.

   a. Provide a separate DDC controller and flat plate space sensor for each unit.
   b. Provide a 2-way, hot water control valve and actuator for installation in the unit by the Mechanical Contractor.

2. During the programmed occupied mode, the unit fan shall cycle. On a fall in space temperature below the programmed setpoint of 65°F, adjustable, the hot water coil control valve shall open. On a rise in temperature above setpoint, the valve shall close.

3. During the programmed un-occupied mode, the fan shall cycle and the hot water coil control valve shall open to maintain the programmed temperature setpoint of 60°F, adjustable.

4. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating, a low temperature alarm shall be activated at the OWS.

5. Provide a current sensor on one phase of power feeding the supply fan for status indication at the OWS.

6. Provide normally open, two-way, blocking control valves in the supply and return hot water heating lines at each unit. Whenever the energy plant is indexed to the heating mode at the OWS, both valves shall remain open. Whenever the energy plant is indexed to the cooling mode at the OWS, both valves shall close.

7. The following items shall be displayed at the OWS:

   a. Space temperature.
   b. Space temperature setpoint.
   c. Discharge temperature.
   d. Commanded status of fan.
   e. Operational status of fan via current sensor.
   f. Low discharge temperature alarm.
   g. Blocking valves position: open/closed.
   h. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install system and materials in accordance with manufacturer's instructions and roughing-in drawings, and details and drawings. Install electrical work and use electrical products complying with requirements of these specifications. Mount controllers at convenient locations and heights.

B. All wiring shall be properly supported and run in a neat and workmanlike manner. All wiring exposed and in equipment rooms shall run parallel to or at right angles to the building structure. All wiring within enclosures shall be neatly bundled and anchored to prevent obstruction to devices and terminals. All wiring shall be in accordance with all local and national codes. Low voltage wiring for space temperature sensors, communication bus between terminal units, etc., above accessible ceilings in finished spaces on the floors may be plenum rated cable. Wiring in all other locations shall be installed in EMT conduit. All electronic wiring shall be #18 AWG minimum THHN and shielded if required, except standard network (Ethernet, LonWorks, etc.) cabling shall be as tested and recommended in lieu of #18 gauge twisted, #22 or #24 gauge is acceptable if used as a part of an engineered structured cabling system. The control manufacturer must submit technical and application documentation demonstrating that this cabling system has

been tested and approved for use by the manufacturer of both the control system and the engineered structured cabling system.

C. Provide all sensing, control, and interlock wiring for the following:

System inputs and outputs
System communications
System power
System interlocks
Unit controls

D. The Control Manufacturer shall enter all computer data into the Host computer including all graphics, control programs, initial approved parameters and settings, and English descriptors. The Control Manufacturer shall maintain diskette copies of all data file and application software for reload use in the event of a system crash or memory failure. One copy shall be delivered to the owner during training sessions, and one copy shall be archived in the Control Manufacturer's local software vault.

3.2 DATA CONTROL (D/C) AND GRAPHICS SUMMARY

A. All hardware, custom software, application software, graphics, etc., necessary to accomplish the control sequences and display the graphics specified shall be provided as part of this contract. Provide all controllers, inputs, outputs, valves, dampers, actuators and flow meters required to provide the control and graphic data described. Provide software setpoints required for display in logical groups and graphics.

B. Each digital output shall have a software-associated monitored input. Any time the monitored input does not track it's associated command output within a programmable time interval, a "command failed" alarm shall be reported.

C. Where calculated points (such as CFM) are shown, they shall appear in their respective logical groups.

D. Unless otherwise specified or approved prior to bidding, the primary analog input and the analog output of each DDC loop shall be resident in a single remote panel containing the DDC algorithm, and shall function independent of any primary or UC communication links. Secondary (reset type) analog inputs may be received from the primary network, but approved default values and/or procedures shall be substituted in the DDC algorithm for this secondary input if network communications fail or if the secondary input becomes erroneous or invalid.

3.3 ACCEPTANCE

A. The Control Manufacturer shall completely check out, calibrate and test all connected hardware and software to insure that the system performs in accordance with the approved specifications and sequences of operations approved.

B. Witnessed acceptance demonstration shall display and demonstrate each type of data entry to show site specific customizing capability; demonstrate parameter changes; execute digital and analog commands; and demonstrate DDC loop stability via trend of inputs and outputs.

3.4 MANUALS

A. The following manuals will be provided:

1. An Operators Manual shall be provided with graphic explanations of keyboard use for all operator functions specified under Operator Training.

B. Computerized printouts of all GPC data file including all point processing assignments, physical terminal relationships, scales and offsets, command and alarm limits, etc.

C. A manual shall be provided including revised as-built documents of all materials required under the paragraph "SUBMITTALS" on this specification.

D. Two Operators Manuals, and two As-Built Manuals shall be provided to the owner.

3.5 TRAINING

A. All training shall be by the BMCS contractor and shall utilize operators manuals and as-built documentation.

B. Operator training shall include three (3) four-hour sessions encompassing modifying text and graphics, sequence of operation review, selection of all displays and reports, use of all specified OWS functions, troubleshooting of sensors (determining bad sensors), and password assignment and modification. One training session shall be conducted at system completion, one shall be conducted forty five days after system completion, and one at ninety (90) days, or as requested by the Owner.

3.6 SERVICE GUARANTEE

A. The control system herein specified shall be free from defects in workmanship and material under normal use and service. After completion of the installation, the control manufacturer shall regulate and adjust all thermostats, control valves, motors and other equipment provided under this contract. If within twelve (12) months from date of acceptance either for beneficial use of final acceptance, whichever is earlier, any of the equipment herein described is proven to be defective in workmanship or materials, it will be replaced or repaired free of charge. The control manufacturer shall, after acceptance, provide any service incidental to the proper performance of the control system under guarantee outlined above for the period of one year. Normal maintenance of the system or adjustments of components is not to be considered part of the guarantee. The control manufacturer will upon completion of the installation, during the warranty period, make available to the Owner, an annual service agreement covering all labor and material required to efficiently maintain the control system.

3.7 FINAL ADJUSTMENT

A. After completion of installation, adjust thermostats, control valves, motors and similar equipment provided as work of this section.

B. Final adjustment shall be performed by specially trained personnel in direct employ of installer of primary temperature control system.

3.8 EXISTING CONTROLS

A. The bid for control work shall be based on the premise that existing control devices are operational and are not in need of repair or replacement unless otherwise noted.

B. Contractor shall notify the Owner of all control devices that need to be replaced or repaired that may be noticed by him in the process of installation of the new work.

END OF SECTION 23 09 00

SECTION 23 09 50

TESTING & BALANCING OF MECHANICAL SYSTEMS

PART 1 – GENERAL

1.1 JOB CONDITIONS

A. Systems shall be completely installed and in continuous operation as required to accomplish the tests.

B. Heating, ventilating and air conditioning equipment shall be completely installed and in continuous operation as required to accomplish the balance work specified.

C. Adjust and balance shall be performed when outside conditions approximate design conditions indicated for heating and cooling functions.

D. Make at least two inspections of the mechanical systems during construction to verify that balancing procedures may be accomplished. Report findings to the Construction Manager.

E. Balancing firm shall balance Mechanical System two (2) times. The first time shall be considered a rough balance. Any discrepancy in air flow shall be addressed to the Construction Manager. The final balancing will be accomplished after review of rough balance reports.

F. The final balancing reports shall be submitted and approved prior to project's being considered complete; i.e., commencement of warranties.

1.2 ENGINEER QUALIFICATIONS

A. The firm shall be an independent organization having no affiliation with construction contractors, equipment sales or design engineering.

B. The firm shall specialize in balancing heating, ventilating and air conditioning systems.

C. The firm shall show proof of having balanced and tested at least five projects of similar size and scope.

D. All field work shall be under the direct supervision of a registered Professional Engineer who is a full-time employee of the balancing firm.

E. The firm shall be certified by and a member of the AABC (Associated Air Balance Council) or NEBB (National Environmental Balancing Bureau).

1.3 REPORT

A. Data Sheets:

1. Submit data sheets on each item of testing equipment required.

2. Include name of device, manufacturer's name, model number, latest date of calibration and correction factors.

B. Report Forms:

1. Submit specimen copies of report forms.

2. Forms shall be 8-1/2 x 11 inch paper for loose-leaf binding, with blanks for listing of the required test ratings and for certification of report.

3. Reports shall be on standard forms published by AABC or NEBB.

PART 2 – PRODUCTS

2.1 AIR BALANCE INSTRUMENTS

A. Alnor Velometer with probes and alnor pitot tube.

B. Rotating Vane Anemometer: 4 inch size.

C. ASHRAE Standard Pitot Tubes, stainless steel 5/16 inch outside diameter, lengths 18 inches and 36 inches.

D. Magnehelic Differential Air Pressure Gauges, 0 to 0.5 inches, 0 to 1.0 inch and 0 to 5.0 inches water pressure ranges, each arranged as a portable unit for use with a standard Pitot tube.

E. Combination Inclined-Vertical Portable Manometer, range 0 to 5.0 inches water.

2.2 WATER BALANCING INSTRUMENTS

A. 30 Inch Mercury U-Tube Manometer, 200 psig, with 3 valve bypass assembly and return wells or mercury check valves.

B. Inspector's gauge testing set.

C. Water Differential Pressure Gauge, 4-1/2 inch dial, 0 to 100 psi range.

D. Pressure gauge measurement points, quick connect couplings, 1/4 inch psi.

2.3 SYSTEM PERFORMANCE MEASURING INSTRUMENTS

A. Insertion Thermometers, with graduation at 0.5 degrees F for air and 0.1 degrees F for water.

B. Sling Psychrometer.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

A. Arrange and pay for all tests.

B. Notify Construction Manager at least three working days in advance of test and conduct in presence of Construction Manager.

C. Tests to be performed prior to insulation, covering or concealment.

D. Provide signed report of completion of test with signature of witnesses. Report shall indicate:

1. System Tested
2. Date
3. Specified test requirements and actual testing results

E. The balancing firm shall report to and review the work required with the Construction Manager before beginning field balance work. The balancing firm shall make at least two inspections of the air systems during construction and shall report his findings in writing to the Architect/Engineer.

F. The balancing firm shall cooperate with the Construction Manager and the Mechanical Contractor to effect smooth coordination of the balancing work with the job schedule.

G. The balancing firm shall be responsible for getting the various systems into proper operation. They shall enlist the aid of the equipment suppliers and Mechanical Contractor as may be required to effect proper operation consistent with the contract plans and specifications.

H. When the balancing firm cannot balance a belt-driven piece of equipment with the supplied belts and sheaves, inform the Mechanical Contractor that the Mechanical Contractor shall provide additional sheaves as spelled out in other Division 23 Sections.

3.2 CIRCULATING WATER SYSTEM TEST

A. All piping tests shall be applied not only to piping, but also to all devices and equipment connected thereto with the exception of control valves, boilers or any other equipment which may be damaged by the test pressure. All valves shall be full open.

B. Test at 100 psi hydrostatic pressure for 6 hours:

1. Record pressures each hour
2. Repair all leaks
3. Retest until 6 hours can be completed with no leaks or loss of pressure.

C. After completion of successful test, strainers shall be cleaned, then system shall be backflushed and strainers cleaned again.

3.3 DUCTWORK TESTING

A. Witness testing conducted by the Mechanical Contractor per Section 15600, PART 3: EXECUTION.

3.4 BALANCING PROCEDURE

A. Air System Balance:

1. With the fan supply system set to handle normal minimum outdoor air, the balancing firm shall perform the following tests and compile the following information:

Air Handling Equipment

a. Design Conditions:

(1) CFM Supply Air
(2) Static Pressure
(3) CFM Fresh Air
(4) Fan RPM

b. Installed Equipment:

(1) Manufacturer
(2) Size/Model Number
(3) Motor HP, Voltage, Phase, Full Load Amperes

c. Field Test:

(1) Fan Speed
(2) No Load Operating Amperes
(3) Fan Motor Operating Amperes
(4) Calculated BHP

d. Test for Total Air:

(1) Size of discharge, return air and outside air ducts.
(2) Number and locations of Velocity Readings taken.
(3) Duct Average Velocity
(4) Total CFM
(5) Outside Air CFM
(6) Return Air CFM

e. Individual Outlets (Diffusers, Registers and/or Grilles):

(1) Identify each outlet or inlet as to location and area and fan system
(2) Outlet, manufacture and type
(3) Outlet size
(4) Outlet free area, core area, or neck area

(5) Required FPM and test velocity found for each outlet.
(6) Required CFM and test results for each outlet

2. After completion of tests, adjustment and balancing under minimum fresh air conditions, set the system for 100% fresh air. Repeat the total CFM tests to check field versus design conditions. The results under 100% fresh air cycle shall agree with conditions found under "minimum fresh air operation" before the system is considered to be in balance. Adjustments of the proper dampers shall be made to achieve balance.

3. Testing and adjusting of individual outlets shall be performed under procedures recommended by the manufacturers of the outlets. All outlets shall be set for air pattern required and all main supply air and return air dampers to be adjusted and set for design CFM indicated. Any required changes in air patterns, settings, etc., necessary for achieving correct air balance, shall be provided by this Contractor. Total CFM of all outlets shall agree with total CFM of all branches and the grand total shall agree with the air volume for the fan(s).

B. Water Balance:

1. Water balance shall include heating water systems. The balancing agency shall perform the following tests, compile data and submit reports.

2. Heating and/or Cooling Elements Including Loop Water to all terminal Units:

a. Design Data:

(1) MBH Specified, GPM Specified
(2) Entering Water Temperature (EWT)
(3) Entering Air Temperature (EAT)
(4) Water Temperature Drop (DTW)
(5) Element Type Specified

b. Field Test:

(1) Identify each element as to location
(2) Required water temperature drop corrected for item (3) above
(3) Actual entering air and water conditions (temperature and GPM)
(4) Adjust element until required temperature drop is obtained

D. In addition to the above work, the Balancing Firm shall check the operation of all automatic temperature control equipment; verify all thermostat, aquastat, etc., set-points and operations; and enlist the aid of the Mechanical Contractor and the Control Subcontractor to make necessary adjustments where required.

END OF SECTION 23 09 50

SECTION 26 00 00

GENERAL PROVISIONS – ELECTRICAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the work of this Section.

B. The specification or drawing and the design features or resulting construction disclosed, are the property of Furlow Associates, Inc., and shall not be reproduced without written permission.

1.2 DESCRIPTION OF WORK

A. Provide all materials, equipment, labor, services and all appurtenances required to completely install and satisfactorily operate the various systems. The items listed below are for general guidance only and do not necessarily include the entire requirements for the project.

1. Coordination with other trades
2. Interior feeders
3. Lighting branch wiring
4. Power wiring
5. Lighting fixtures and lamps
6. Wiring devices
7. Connections for electrically operated equipment
8. Fire alarm and detection system
9. Related work as herein described or otherwise defined under the heading "Related Work".

B. Wherever the term "provide" is used, it shall be understood to mean both "furnish" and "install".

1.3 RELATED WORK

A. Equipment specified in sections of Divisions 1 thru 23 that require electric power supply.

B. Work related to this trade as defined on the following contract drawings:
Architectural/Structural
HVAC
Plumbing

1.4 SITE CONDITIONS

A. Attention of all bidders is called to the necessity for a careful inspection of the site, its present condition and encumbrances, the extent of the work, the protection to be afforded to adjacent properties or structure, availability of utilities, the extent and nature of the material required to be excavated and the amount of fill and removal. He shall also determine local or site limitations which will affect construction.

1.5 PERMITS, INSPECTIONS AND ORDINANCES

A. All work shall be executed and inspected in accordance with local and state ordinances, rules and regulations and the requirements of public utilities having jurisdiction. The contractor shall secure and pay for all permits, inspections and connections required.

B. The Electrical Contractor shall furnish a certificate of inspection to the Owner at the time of completion.

C. Requirements of the following organization shall be considered minimum:

1. National Electrical Code
2. National Electrical Safety Code
3. OSHA
4. Local City and County Codes

D. Reference to technical societies, trade organizations and governmental agencies are in accordance with the following:

1. ANSI - American National Standards Institute
2. ASTM - American Society for Testing Materials
3. IEEE - Institute of Electrical and Electronics Engineers, Inc.
4. NEC - National Electrical Code
5. NEMA - National Electrical Manufacturer's Association
6. NFPA - National Fire Protection Association
7. MSS - Manufacturer's Standardization Society
8. IES - Illuminating Engineers Society
9. ETL - Engineering Testing Laboratories
10. EIA - Electronic Industries Association
11. OSHA - Occupational Safety and Health Administration
12. Federal Specifications
13. UL - Underwriters Laboratories, Inc.

1.6 QUALITY ASSURANCE

A. Provide adequate supervision of labor force to assure that all aspects of the contract documents are fulfilled.

B. Contractor to provide manufacturer’s written certification that the following equipment has been installed and will operate correctly and in accordance with the manufacturer’s warranty requirements.

Fire Alarm and Detection System

C. Testing:

1. After completion of the work, the entire wiring system shall test entirely free from grounds, short circuits, opens, overloads and improper voltage.

2. The grounding system shall be tested for a resistance of 25 ohms or less.

3. Perform testing as follows: Arrange and pay for all tests, provide all equipment, materials and labor to perform test. Notify Engineer and Owner three (3) working days before tests are to be made. Conduct tests in the presence of the Engineer or authorized representative. Repeat tests after defects are corrected.

D. Special Engineering Services: In the instance of complex specialized electrical power and signaling systems, and other similar systems, the installation and final connections of these systems shall be made by and/or under the supervision of a competent installation and service engineer who shall be a representative of the respective equipment manufacturer. Any and all expenses of these installation and service engineers shall be borne by this Contractor.

1.7 COORDINATION

A. As a requirement of this project, the Electrical Contractor shall furnish coordination for his equipment and layouts with other subcontractors furnishing equipment and services for Divisions 1 thru 23. Any and all contractors who install their equipment or furnish services prior to coordination, any contractor who changes their equipment or services after coordination has occurred, without notifying associated subcontractors, shall be held responsible for making all required changes with no additional cost to the Owner. Or delay in construction time. This coordination will include conduit layout to allow access to equipment for maintenance.

B. The Mechanical, Plumbing and Electrical Contractors are responsible to coordinate all manufacturer's recommended circuit breakers, starters, disconnects and fuse sizes for all equipment. Submission of a shop drawing will certify that this has been completed.

C. The drawings and specifications reflect the type, number and size of services required for the equipment the design is based upon. Should the supplying subcontractor elect to furnish an alternate piece of equipment requiring difference services and/or space conditions, he shall inform the subcontractor furnishing those services and be held responsible to pay for all required changes as part of this contract.

1.8 SUBMITTALS

A. Shop Drawings:

1. Shop drawings shall be submitted in accordance with Division 1 of these specifications except where herein modified.

NOTE: Submittals will only be reviewed once and resubmittals will be reviewed once. Any other submittals will be billed to the Contractor at the Engineer's standard rates.

2. Shop drawings comprising complete catalog cuts, performance test data for electrical equipment as required by other sections of Division 26 shall be submitted for review checking. The Contractor shall review these shop drawings for conformance to contract documents prior to submission and affix contractor's signature to each submittal certifying that this review has been done. By approving and submitting shop drawings, product data,

wiring diagrams and similar materials, the Electrical Contractor represents that he and/or his subcontractor has determined and verified materials, field measurements and field construction data that relates to the work, and has checked and coordinated this information with all of the Divisions 1 thru 23 subcontractors.

3. All shop drawing submittals shall have the following identification data, as applicable, contained therein or permanently adhered thereto:

   a. Project name

   b. Project number

   c. Sub-Contractor's, Vendor's and/or manufacturer's name and address.

   d. Product identification.

   e. Identification of deviation from the contract documents.

   f. Applicable contract drawings and specification section number.

   g. Shop drawing title, drawing number, revision number, and date of drawing and revision.

   h. Resubmit revised or additional shop drawings as requested.

   i. Wherever shop drawings or vendor's standard data sheets indicate work to be done "by others", it shall be the responsibility of the Contractor making the submission to identify by name, the Contractor who is to do this work. If the Contractor named is other than the Contractor making the submission, the shop drawing submission must be reviewed by the named Contractor and bear his mark of approval, prior to submission to the Architect/Engineer.

   j. Where equipment proposed differs from that shown on the drawings or specified, he shall submit for approval drawings showing the manner in which the layout is affected by the substitution.

   k. The Contractor shall keep one copy of approved shop drawings at the job site, filed in a suitable metal container. The shop drawings shall be cataloged and kept in good repair, and shall be available for use by the Owner, Architect and Engineer.

   l. No equipment shall be ordered, fabricated, etc., before approval of shop drawings.

1.9 SUBSTITUTIONS

A. Whenever a material, article, piece of equipment or system is identified in the following specification or indicated on the drawings by reference to manufacturers' or vendors' names, trade names, catalog numbers or the like, it is so identified for the purpose of establishing the basis of the Bid.

B. Substitution approval must be obtained and included as an addendum item prior to the submission of the bid. An approved substitution shall not be considered as an approval for the contractor or an equipment vendor to deviate from the written portion of the specifications unless so stated in the addendum.

C. The drawings illustrate the space allocated for equipment and the Contractor shall install the equipment accordingly. If changes are required in the building or arrangement due to substitution of equipment, the Contractor making the substitution must pay for the necessary modifications.

D. The listed equivalent or substituted manufacturers along with the bidding related contractor shall be completely responsible to comply with all requirements on all contract documents. This shall include, but shall not be limited to space requirements, code clearances, the type, horsepower, capacities, number and size of services required from other trades, including all required ancillary items furnished and installed by other trades. If the manufacturer or related bidding contractor does not comply with these requirements, then they shall be responsible for any and all additional costs associated with the changes required by other trades.

1.10 LUBRICATION

A. Furnish, install and maintain all required lubrication of any equipment operated prior to acceptance by the Owner. Lubrication shall be as recommended by the equipment manufacturer.

B. Provide one year's supply of lubricants to Owner at date of acceptance.

C. Verify that required lubrication has taken place prior to any equipment start-up.

1.11 ADJUSTMENT & CLEANING

A. Adjust and clean equipment to be placed in proper operation condition.

1.12 EQUIPMENT START-UP

A. Verify proper installation by manufacturer or his representative.

B. Advise General Contractor 2 days prior to actual start-up.

C. Verify proper operation. Obtain signed statement by manufacturer or his representative that equipment is operating within warranty requirements. Submit statement to General Contractor.

1.13 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Properly and fully instruct Owner's personnel in the operation and maintenance of all systems and equipment.

B. Insure that the Owner's personnel are familiar with all operations to carry on required activities.

C. Such instruction shall be for each item of equipment and each system as a whole.

D. Provide report that instruction has taken place. Include in the report the equipment and/or systems instructed, date, contractor, Owner's personnel, vendor, and that a complete operating and maintenance manual has been reviewed.

E. Manual shall include all instructions on operation, maintenance, repair parts list, lubrication requirements, brochures, catalogue cuts, wiring diagrams, piping diagrams, control sequences, service requirements, names and addresses of vendors, suppliers and emergency contacts. Three manuals shall be provided.

F. Submit manuals for review prior to operating instruction period. Manuals shall be 8-1/2 x 11" with hard cover, suitably bound.

1.14 TOOLS

A. All equipment furnished by the Contractor which requires special tools or devices other than those normally available to the maintenance or operating staff shall be furnished in duplicate to the Owner, sufficiently marked, packed or boxed for staff usage. The tools provided shall be listed by the Contractor identified as to their use or the equipment applicable in a written transmittal to the Owner.

1.15 CLEANING AND FINISHING

A. After equipment start-up and all operating tests have been made and the system pronounced satisfactory, each respective Contractor shall go over the entire project, clean all equipment, etc., installed by him and leave in a clean and working condition. Any surfaces found marred after this final cleaning shall be refinished or replaced by each Contractor at no cost to the Owner.

1.16 OPERATING AND MAINTENANCE MANUALS

A. Three complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished to the Architect. Each set shall be furnished before the contract is completed. The following identification shall be inscribed on the covers: the words "OPERATING AND MAINTENANCE INSTRUCTIONS", the name and location of the building, the name of the Contractor and the name of the Architect and Engineer. Flysheet shall be placed before instructions covering each subject. The instruction sheets shall be approximately 8-1/2 by 11 inches, with large sheets of drawings folded in. The instructions shall include, but shall not be limited to, the following:

Approved wiring and control diagrams, with data to explain the detailed operation and control of each component.

A control sequence describing start-up, operation and shutdown.

Operating and maintenance instructions for each piece of equipment, including lubrication instructions.

Manufacturer's bulletins, cuts and descriptive data.

Parts lists and recommended spare parts.

1.17 SERVICE INTERRUPTION

A. All service interruptions to the electric or related systems, whether during regular working hours or at any other time, must be coordinated with the Owner. All such interruptions shall be so scheduled and planned as to require a minimum of time and shall occur only during a mutually satisfactory period.

1.18 INTERPRETATION OF SYSTEMS

A. The interpretation of the Architect will be final in the event there is a lack of understanding of the full scope or requirements of the systems under this contract.

1.19 LAYOUTS

A. On small scale drawings, i.e., 1/8" - 1'-0", the approximate location of the electrical branch circuit items such as receptacle, telephone, grounding and equipment outlets are shown to indicate their existence. The exact location of these items and their related raceways are governed by structural conditions, coordination with the work of other trades and the Architect's final decision. By accepting a contract, the Contractor agrees to install the work in accordance with the above statement and within the contract price.

PART 2 – PRODUCTS

2.1 MATERIAL

A. All material shall be new and of good quality. Material shall conform to all accepted trade standards, codes, ordinances, regulations, or requirements governing same, and shall be approved before being installed.

B. The Architect reserves the right to require the Contractors to submit samples of any or all articles or materials to be used on the project.

C. Where any device or equipment is herein referred to in the singular number, such as "the panel", this reference shall be deemed to apply to as many such devices or equipment as are required to complete the installation as shown on the drawings or specified.

D. All materials and equipment used in the work shall comply with the standards of recognized authorities such as UL, NEMA, IEEE, ETL, IES and EIA in every instance where such standards have been established for the particular type of materials to be installed.

E. All similar pieces of equipment or materials of the same type or classification used for the same purpose shall be of the same manufacturer.

F. All manufactured equipment shall have factory applied finishes.

2.2 CONCRETE

A. Concrete shall be in accordance with Section 03300, or ACI-613. Designer choice if 03300 is not used.

B. The 28-day minimum compressive strength shall be 3000 psi.

2.3 WARRANTY

A. Wherever in the specification sections of this division, reference is made to a specific warranty period, this warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the contract documents.

PART 3 – EXECUTION

3.1 INSPECTION

A. Prior to performing the work, examine areas and conditions; check and verify all dimensions, under which the work is to be installed and notify the Architect in writing of conditions and dimensions detrimental to the proper and timely completion of the work. Do not proceed until authorization is given by the Architect.

3.2 LAYING OUT WORK

A. The Contractor is responsible for the accuracy of all lines, elevations, and measurements, grading and utilities and must exercise proper precaution to verify figures shown on drawings before laying out work and will be held responsible for any error resulting from his failure to exercise such precaution.

3.3 WORKMANSHIP

A. Install all work neat, trim, parallel and plumb with building lines in accordance with standard trade practice acceptable to the Architect.

3.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect all equipment and materials from damage during transportation, storage and installation.

3.5 PROTECTION

A. Protect all work, equipment and materials during construction up to the time of acceptance by the Owner.

Arrange and design the protection to prevent damage from infiltration or dust, debris, moisture, chemicals and water. Cap or plug electrical raceways.

B. Protect all surfaces against damage from welding, cutting, burning, or similar construction functions. This protection shall be accomplished by care in operations, covering and shielding. Special care is directed to exposed finished masonry, metal or wood surfaces and painted surfaces. Corrective measures required shall be accomplished by the trade which made the original installation when and as directed by the Architect at the expense of the Contractor.

C. Cover and protect all lighting fixtures as may be necessary until completion of the work. Replace damaged fixtures or damaged fixture parts as directed by the Architect at no cost to the Owner.

D. Do not install devices, polished metal fittings or parts until adjoining tile or masonry work is completed.

E. Maintain and replace protective covering when so directed by the Architect until the work is ready for acceptance.

3.6 CUTTING & PATCHING

A. Furnish information to the General Contractor as to sizes and locations of recesses required to install panel boxes and other equipment or devices. If the information is late or incorrect, this Contractor shall, at his own expense, have the trade which originally installed the work do the required cutting and patching.

B. Perform all cutting of concrete or other material for passage of raceways as required to install the work.

C. Close all such openings around raceways with material as specified under the heading "SEALING".

D. Install concealed work in place for the mason to wall-in as he carries up the walls; otherwise, this Contractor will be responsible as stated in the first paragraph.

3.7 SEALING

A. Where raceways pass through fire-rated walls and floors, seal opening with RTV foam.

B. Seal raceways entering the building to conform to the requirements of the NEC.

3.8 OFFSETS AND MODIFICATIONS

A. Furnish and install all offsets necessary to install the work and to provide clearance for the work of other trades.

B. Maintain adequate clearance as directed by the Architect/Engineer.

C. Incidental modifications necessary to the installation shall be made as necessary and at the direction and/or approval of the Architect.

3.9 SLEEVES

A. Furnish and install sleeves for all raceways passing through floors and walls. Sleeves shall be Schedule 40 galvanized steel pipe and shall extend 1" above finished floor surface. Where sleeves are set in interior walls, they shall finish flush with the wall.

B. Furnish and install watertight sleeves for all raceways extending through foundation walls into crawl spaces, mechanical rooms or basement areas from building exterior or from unexcavated

areas to building interior. Sleeve shall consist of extra heavy pipe sleeve with anchor flange. Space between raceway and the sleeve shall be sealed with modular wall and casing seal similar to Thunderline Corporation "Link-Seal",, Metraseal or approved substitute. Install seal in strict accordance with the manufacturer's recommendations.

3.10 ITEMS RECESSED IN MASONRY CONSTRUCTION

A. Wherever boxes, electric panels, equipment, devices, access panels, and similar items of electrical construction are installed in exposed masonry construction, the Contractor shall utilize and submit for approval items of such size, height, and arrangement to conform to the corresponding masonry unit. The Contractor shall include as part of this contract, the necessary offsets, adjustments and relocations necessary to conform with the instructions of the Architect as to the final location of the equipment item in the exposed masonry.

B. As part of his contract and before the purchase of the items hereinbefore mentioned, the Contractor shall notify the Architect of such modifications in the building arrangement that will be necessary to accommodate the proposed equipment.

3.11 ROOF FLASHINGS

A. All conduit extending through roofs shall be provided with watertight flashing and counterflashing as hereinafter described.

B. Furnish and install standard counterflashing fittings on the conduit or properly designed clamped counterflashing with caulking as directed by the Architect/Engineer.

3.12 PAINTING

A. Refinish all factory applied finishes that have been damaged to match the original finish as directed by the Architect.

B. Prime coat all steel furnished under this Division with material and methods as described in another Section under the heading "PAINTING".

3.13 EQUIPMENT CONNECTIONS

A. Provide required wiring, raceways and final connections for all equipment provided by this Division and Divisions 1 thru 23.

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B. Make final connections in accordance with wiring diagrams obtained from equipment manufacturer.

C. Rough-in in accordance with approved shop drawings from the manufacturer or supplier of the equipment. Rough-in prior to shop drawing approval will be subject to change without adjustment to contract cost.

3.14 BALANCING

A. The system of feeder and branch circuits for power and lighting shall be connected to panel busses in such a manner as to electrically balance the connected load as close as is practicable. Should the Owner disclose any unfavorable conditions reacting on the service, this Contractor shall make such changes as may be suggested to balance the load.

3.15 GUARANTEE

A. All work shall be guaranteed to be free from defects for a period of one year of operation from date of acceptance by the Owner unless otherwise specified in Division 1.

B. Guarantee shall be extended on an equal time basis for all non- operational periods due to failure within the guarantee period.

C. Contractor to include an 11 month "walk-thru" of the building system with representatives of the School District, Architect, Engineer and the Construction Manager. The purpose is to establish a list of corrective work that relates to operational issues, material/installation deficiencies.

END OF SECTION 26 00 00

SECTION 26 00 55

ELECTRICAL IDENTIFICATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. This section is a Division 26 Basic Materials and Methods Section, and is part of each Division 26 Section making reference to electrical identification specified herein.

1.2 DESCRIPTION OF WORK

A. Types of electrical identification specified in this section include the following:

Cable conductor identification.
Operational instructions and warnings.
Danger signs.
Equipment/system identification signs.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following (for each type of marker):

W. H. Brady Co.
Ideal Industries, Inc.
Seton Name Plate Co.
3M Electrical Products

2.2 ELECTRICAL IDENTIFICATION MATERIALS

A. Provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

2.3 COLOR-CODED PLASTIC TAPE

A. Provide manufacturer's standard vinyl tape not less than 7 mils thick by 3/4" wide.

B. Colors: Unless otherwise indicated or required by governing regulations, provide tape color as indicated in Paragraph 3.2.B.

C. Tape shall be of Type 3M Scotch 35 for color coding, Scotch Super 33+ for splices and Tem Flex 1700 for general use.

2.4 CABLE/CONDUCTOR IDENTIFICATION BANDS

A. Provide manufacturer's standard vinyl cloth, self-adhesive cable/conductor markers of wrap-around type; either pre-numbered, plastic-coated type, or write-on type with clear plastic, self-adhesive cover flap; numbered to show circuit identification.

2.5 BAKED ENAMEL DANGER SIGNS

A. Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20-gage steel; of standard red, black and white graphics; 14" x 10" size except where 10"x 7"is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording (as examples: HIGH VOLTAGE, KEEP AWAY, BURIED CABLE, DO NOT TOUCH SWITCH).

2.6 ENGRAVED PLASTIC-LAMINATE SIGNS

A. Provide engraved stock melamine plastic laminate, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.

C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

2.7 LETTERING AND GRAPHICS

A. Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

PART 3 – EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

B. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

3.2 CABLE/CONDUCTOR IDENTIFICATION

A. Apply cable/conductor identification on each cable and conductor in each box/enclosure/cabinet where wires of more than one circuit or communication/signal system are present. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for project electrical work.

B. Conductor Color Coding:

1. All conductors used in all systems shall have insulation that is inherently colored. All conductors of a system performing the same function shall be colored alike throughout the project.

2. Equipment Grounding Conductors:

   a. Standard and/or general feeders or circuits shall be green.
   b. Isolated feeders or circuits shall be green with yellow stripe.

3. On larger conductors, where colored insulation is not available, colored tape adhesive vinyl bands 3/4" width may be installed 6" maximum from the end of the conductors. Where passing through pull boxes without splice, each conductor shall be banded.

4. Power system conductor colors shall be as follows:

   a. 120/208 Volt System

      Phase A - Black
      Phase B - Red
      Phase C - Blue
      Neutral - White or Gray

   b. 277/480 Volt System

      Phase A - Brown
      Phase B - Orange
      Phase C - Yellow
      Neutral - White or Gray

3.3 DANGER SIGNS

A. In addition to installation of danger signs required by governing regulations and authorities, install appropriate danger signs at locations indicated and at locations subsequently identified by Installer of electrical work as constituting similar dangers for persons in or about project.

B. High Voltage: Install danger signs wherever it is possible, under any circumstances, for persons to come into contact with electrical power voltages higher than 110-120 volts.

3.4 EQUIPMENT/SYSTEM IDENTIFICATION

A. Install engraved, plastic laminate sign on each major unit of electrical equipment in building, including central or master unit of each electrical system including communication/signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawing. Provide signs for each unit of the following categories of electrical work:

1. Panelboards, electrical cabinets and enclosures.
2. Access panel/doors to electrical facilities.
3. Major electrical switchgear, main and feeder circuit breakers and/or disconnects..

B. Install signs at locations for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate the substrate.

3.5 JUNCTION AND PULL BOX IDENTIFICATION

A. Emergency Systems: Each junction and pull box cover shall be painted orange. Use black indelible liquid marker to label "EMERG." in 3/8" letters minimum.

B. Fire Alarm System: Each junction and pull box cover shall be painted red. Use black indelible liquid marker to label "F.A." in 3/8" letters minimum.

C. Feeders Shown on Single Line Diagram: Each junction and pull box shall be marked with black indelible liquid marker with the assigned feeder number "FDR #38" in 3/8" letters minimum.

END OF SECTION 26 00 55

SECTION 26 01 10

RACEWAYS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

B. Refer to Section 260000 for General Provisions - Electrical.

1.2 DESCRIPTION OF WORK

A. Types of raceways in this section include the following:

Rigid metal conduit
Intermediate metal conduit
Electrical metallic tubing.
Flexible metal conduit.
Liquid-tight flexible metal conduit.
Wireways.

1.3 REFERENCE STANDARDS

A. Refer to Section 260000 for a general description of requirements applying to this Section.

1.4 QUALITY ASSURANCE

A. Refer to Section 260000 for a general description of requirements applying to this Section.

1.5 WARRANTY/GUARANTEE

A. All work and materials are subject to the general warranty as described in the General Conditions of the Contract and in Division 1, GENERAL REQUIREMENTS.

1.6 COORDINATION

A. The drawings and details there upon are scheme and/or diagrammatic in nature, and indicate the need and intent of the design. These are to be used for general guidance only. It shall be the responsibility of the Electrical Contractor to coordinate, with other Division Subcontractors, the installation of all raceways, raceway supports, junction boxes and required fittings. This coordination will include conduit layout to allow access to equipment for maintenance.

B. This coordination shall be carried out prior to actual installation; this shall be done to eliminate the possibility of conflicts between trades on items such as access, clearances and maintenance issues that may arise after completion of construction.

C. Should the coordination not be carried out prior to installation, and a conflict exists, the installing contractor shall remove and reinstall the equipment as required to clear the conflict at no additional cost to the Owner and no delay in project completion.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Rigid Metal Conduit:

1. Raceway: Full weight, heavy wall rigid steel with zinc coating conforming to ANSI-C80.1.

2. Fittings: Cast malleable iron fittings with threaded hubs, insulated throat and zinc protective coating.

3. Subject to compliance with requirements, provide products of one of the following:

   Allied Tube and Conduit Corporation
   LTV Steel Tubular Products Co.
   Wheatland Tube

B. Intermediate Metal Conduit:

1. Raceway: Light weight, rigid steel, hot dipped galvanized manufactured in accordance with UL1242.

2. Fittings: Cast malleable iron fittings with threaded hubs, insulated throat and zinc protective coating.

3. Subject to compliance with requirements, provide products of one of the following:

   Allied Tube and Conduit Corporation
   LTV Steel Tubular Products Co.
   Wheatland Tube

C. Electrical Metallic Tubing:

1. Raceway: Light weight, thin wall, rigid steel, hot dipped galvanized manufactured in accordance with ANSI C80.3.

2. Fittings: Raintight, insulated throat, compression type with zinc protective coating.

3. Subject to compliance with requirements, provide products of one of the following:

   Allied Tube and Conduit Corp.
   LTV Steel Tubular Products Co.
   Wheatland Tube Co.

D. Flexible Metal Conduit:

1. Raceway: Construct of single strip, flexible, continuous, interlocked, and double-wrapped steel, galvanized inside and outside.

2. Fittings: Steel, insulated throat, with zinc protective coating.

3. Subject to compliance with requirements, provide products of one of the following:

   AFC
   Alflex Corp.
   Electri-Flex Company

D. Liquid-Tight Flexible Metal Conduit:

1. Raceway: Construct of single strip, flexible, continuous, interlocked, and double-wrapped, galvanized inside and outside, coat with liquid-tight jacket of flexible polyvinyl chloride.

2. Fittings: Steel, water and oiltight, insulated throat, with zinc protective coating.

3. Subject to compliance with requirements, provide products of one of the following:

   AFC
   Alflex Corp.
   Electri-Flex Company

F. Wireways:

1. Furnish electrical wireways of the type, size, and style for each service indicated. Wireway shall be a complete assembly including but not necessarily limited to, couplings, offsets, elbows, adapters, hold-down clips, end-caps and other components and accessories as needed for a complete system.

2. System shall fulfill wiring requirements as indicated in contract documents, and shall comply with applicable portions of Article 362 of the National Electrical Code.

3. Subject to compliance with requirements, provide products of one of the following:

   Circle AW Products Co.
   The EMF Company, Inc.
   Hoffman Engineering Company
   Square "D" Company

G. The above items shall include the statement "Approved Equal" and/or "Approved Substitute". This statement requires that the product or item be in compliance with the written intent of this specification and the submission meets the requirements of Section 260000.

PART 3 – EXECUTION

3.1 INSTALLATION OF ELECTRICAL RACEWAYS

A. Install electrical raceways in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA "Standard of Installation", and complying with recognized industry practices.

B. Coordinate with other work as necessary to interface installation of electrical raceways, wireways and required components.

C. Raceways used for distribution, feeders, or branch circuits shall be a minimum size of 3/4" or equal equivalent cross-sectional area. Raceways used for control and signal shall be a minimum size of 1/2" or equal equivalent cross-sectional area.

D. All raceways shall be concealed within the building construction, where indicated on the floor plans surface raceway shall be installed. Should it be impossible or impracticable to install a raceway concealed and surface raceway is not indicated, the Contractor shall consult with the Architect or Engineer for approval prior to installation.

E. All raceways installed in ceiling cavities and exposed within mechanical spaces shall be run parallel with building lines and installed level and square at the proper elevation/height.

F. Complete the installation of electrical raceways before starting the installation of cables/wires within the raceway.

G. Furnish and install one (1) nylon or fiberglass pull cord in each empty raceway. Each empty raceway shall be cleaned, capped, and tagged as to its termination location.

H. Install liquid-tight flexible metal conduit for connections to motors and for other electrical equipment when subject to movement and vibration, and also where subjected to one or more of the following conditions:

1. Exterior locations.
2. Moist or humid atmosphere when condensation can be expected to accumulate.
3. Corrosive atmosphere.
4. Subjected to water spray.
5. Subjected to dripping oil, grease or water.

I. Install Electrical Metallic Tubing for building interior electrical work except:

1. Underground
2. In gravel, cinder, concrete or other sub-base floor construction.
3. Horizontal runs in concrete floor slabs.
4. Where exposed to the elements.
5. In masonry construction below finished grade.
6. Vertically in poured concrete walls.

J. Refer to Section 260000 for excavation, shoring and pumping, concrete and backfilling requirements.

K. Where and whenever possible, install horizontal electrical raceways as tight to building construction as possible and above water, drain and steam piping. A separation of at least six (6) inches shall be maintained between electrical conduits and hot water and steam piping.

L. In accordance with NEC requirements, install Rigid or Intermediate Metal Conduit where Electrical Metallic Tubing is not permitted.

M. In all instances where recessed type panelboards are installed, furnish and install one (1) one inch raceway for each two (2) future circuits for which "space" or "spare" provisions have been made in the panelboard. These raceways shall extend between the panelboard cabinet and a convenient location above an access panel or a removable tile ceiling construction and capped.

3.2 CLEANING

A. Upon completion of installation of raceways, inspect interiors of raceways; remove burrs, dirt and construction debris.

END OF SECTION 26 01 10

SECTION 26 01 20

WIRES AND CABLES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. This section is a Division 26 Basic Materials and Methods section and is part of each Division 26 Section making reference to wires and cables specified herein.

1.2 DESCRIPTION OF WORK

A. Electrical wire and electrical cable work is indicated by drawings and specifications.

B. Types of wire, cable and connectors in this section include, but not limited to the following:

Copper conductors.
Tap type connectors.
Split-bolt connectors.

C. Refer to other sections of Division 26 for, but not limited to, raceways, connections used in conjunction with wire and cable work.

D. Applications for wire, cable and connectors required for project are as follows unless otherwise indicated:

1. Power Distribution Circuitry.
2. Appliance and Equipment Circuitry.
3. Motor Branch Circuitry.
4. Control Circuitry.
5. Signal/Communication Circuitry.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. <u>Wire and Cable</u>

Anaconda Wire and Cable Co.
Advance Wire and Cable, Inc.
American
Cerro Wire and Cable Co.
Electrical Conductors, Inc.
General Cable Corp.
Rome Cable Corp.
Southwire Company
Triangle PWC,, Inc.
General Electric Co.

Connectors

Burndy Corp.
Eagle Electric Mfg. Co., Inc.
Gould, Inc.
Ideal Industries, Inc
Joslyn Mfg. and Supply Co.
O-Z/Gedney Co.
Pyle National Co.
Thomas and Betts Co.

2.2 WIRE, CABLE AND CONNECTIONS

A. Except as otherwise indicated, provide wire, cable and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer, and as required for the installation. Minimum wire and cable size is #12 AWG for power and branch circuits and #14 AWG for control and signal/communication circuits unless otherwise indicated.

B. Wire: Provide factory fabricated wire of sizes, ratings, materials and types indicated for each service. Where not indicated, provide proper selection as determined by Installer to comply with project's installation requirements and NEC standards. Select from the following types, materials, conductor configurations, insulation and coverings:

UL Type: THHN
UL Type: TW
UL Type: THW
UL Type: THWN
UL Type: TF
UL Type: XHHW
UL Type: MC (Metal Clad)

Material: Copper

Conductors: Solid (AWG 14 to AWG 10 only).
Conductors: Concentric-lay-stranded (standard flexibility)

Outer Covering: Nylon
Outer Covering: Thermoplastic

C. Connectors: Provide factory fabricated metal connectors of sizes, ratings, materials, types and classes as required for each service. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and NEC standards. Select from the following types, classes, kinds and styles.

Type: Pressure
Type: Crimp
Type: Threaded

Class: Insulated
Class: Non-insulated

Kind: Copper (for CU to Cu connection).

Style: Butt connection
Style: Elbow connection
Style: Combined "T" and straight connection
Style: "T" connection.
Style: Split-bolt parallel connection
Style: Tap connection
Style: Pigtail connection

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install electrical cables, wires and connectors, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices.

B. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface. Pull conductors together where more than one is being installed in a raceway. Use pulling compound or lubricate, where necessary; compound must not deteriorate conductor or insulation. Use pulling means including fish tape, cable or rope which cannot damage raceway. Rope must be used as pulling means when pulling wires or cables into plastic conduit and duct. Keep conductor splices to a minimum and install in junction boxes only. No splices shall be permitted within conduit. Install splices and tapes which have mechanical strength and insulation rating equivalent or better than conductor. Use splice and tape connectors which are compatible with conductor material.

3.2 FIELD QUALITY CONTROL

A. Prior to energization, test cable and wire for continuity of circuitry and also for short circuits. Correct malfunctions when detected.

B. Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

END OF SECTION 26 01 20

SECTION 26 01 21

WIRE CONNECTIONS AND DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. This section is a Division 26 Basic Materials and Methods Section and is part of each Division 26 Section making reference to connectors and termination devices specified herein.

1.2 DESCRIPTION OF WORK

A. Extent of electrical connectors and termination work is indicated by drawings and specifications.

B. Types of connectors and termination devices in this section include, but are not limited to the following:

1. Tap type connectors.
2. Split-bolt connectors.

C. Refer to other sections of Division 26 for, but not limited to, raceways, wires and cables used in conjunction with connectors and termination devices.

D. Applications for connectors and termination devices required for project are as follows unless otherwise indicated:

1. Branch circuitry
2. Equipment circuitry
3. Control circuitry

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical connectors, high voltage termination to the Engineer.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide connectors, high voltage terminations of one of the following manufacturers for each item used:

Burndy Corp.
Eagle Electric Mfg. Co., Inc.
Gould, Inc.
Ideal Industries, Inc.
Joslyn Mfg. and Supply Co.
O-Z/Gedney Co.

Pyle National Co.
Thomas and Betts Co.
Cooper Power Systems

2.2 CONNECTORS

A. Provide factory fabricated metal connectors of sizes, ratings, materials, types and classes as indicated for each service. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and NEC standards.

Type: Pressure
Crimp
Threaded
Class: Insulated
Non-Insulated
Kind: Copper (for CU to Cu connection).
Style: Butt Connection
Elbow connection
Combined "T" and straight connection
"T" connection
Split-bolt parallel connection
Tap connection
Pigtail connection

PART 3 – EXECUTION

3.1 600 VOLT CABLE CONNECTOR INSTALLATION

A. Install electrical connectors, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices.

B. Coordinate cable, wire and connector installation work with electrical raceway and equipment installation work, as necessary for proper interface. Pull conductors together where more than one is being installed in a raceway. Use pulling compound or lubricate, where necessary, compound must not deteriorate conductor of insulation, and must be in accordance with wire and cable manufacturer's recommendations. Use pulling means including fish tape, cable or rope which shall not damage raceways including plastic conduits and ducts.

3.2 FIELD QUALITY CONTROL

A. Prior to energization, test cable and wire for continuity of circuitry and also for short circuits. Correct malfunctions when detected.

B. Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

END OF SECTION 26 01 21

SECTION 26 01 35

ELECTRICAL BOXES & FITTINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. This section is a Division 26 Basic Materials and Methods section, and is a part of each Division 26 section making reference to electrical wiring boxes and fittings specified herein.

1.2 DESCRIPTION OF WORK

A. Types of electrical boxes and fittings in this section include the following:

Outlet boxes.
Junction boxes.
Pull boxes.
Conduit bodies.
Bushings.
Locknuts.
Knockout closures.

PART 2 – PRODUCTS

2.1 INTERIOR METALLIC OUTLET BOXES

A. Provide galvanized flat rolled sheet steel interior outlet non-gangable wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation; construct with stamped knockouts in back and sides and with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.

B. Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations. Choice of accessories is Installer's option.

C. Manufacturer: Subject to compliance with requirements, provide interior outlet boxes of one of the following:

Appleton Electric Co.
Bell Electric/Square D Co.
Pass and Seymour, Inc.
RACO, Inc.
Steel City/Midland-Ross Corp.

2.2 WEATHERPROOF OUTLET BOXES

A. Provide corrosion resistant cast-metal weatherproof outlet wiring boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit ends, cast-metal face plates with spring-hinged waterproof caps suitably configured for each application, including face plate gaskets and corrosion-resistant fasteners.

B. Manufacturer: Subject to compliance with requirements, provide weatherproof outlet boxes of one of the following:

Arrow-Hart Div., Crouse-Hinds Co.
Bell Electric/Square D Co.
Harvey Hubbell, Inc.
O-Z/Gedney Co.
Slater Electric Co.

2.3 JUNCTION PULL BOXES

A. Provide galvanized code-gauge sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

B. Manufacturers: Subject to compliance with requirements, provide junction and pull boxes of one of the following:

Adalet-PLM Div., Scott and Fetzer Co.
Appleton Electric Co.
Arrow-Hart Div., Crouse-Hinds Co.
Bell Electric/Square D Co.
GTE Corporation
Keystone Columbia, Inc.
O-Z/Gedney Co.
Slater Electric Co.
Spring City Elect. Mfg. Co.

2.4 CONDUIT BODIES

A. Provide galvanized cast-metal conduit bodies, of types, shapes, and sizes, to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion- resistant screws.

B. Manufacturers: Subject to compliance with requirements, provide conduit bodies of one of the following:

Appleton Electric Co.
Crouse-Hinds Co.
Gould, Inc.
Killark Electric Mfg. Co.
O-Z/Gedney Co.
Spring City Electrical Mfg. Co.

2.5 BUSHINGS, KNOCKOUT CLOSURES AND LOCKNUTS

A. Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and insulated malleable iron conduit bushings, offset connectors, of types and sizes to suit respective uses and installation.

B. Manufacturers: Subject to compliance with requirements, provide bushings, knockout closures, locknuts and connectors of one of the following:

Appleton Electric Co.
Burndy Corp.
Crouse-Hinds Co.
Gould, Inc.
O-Z/Gedney Co.
RACO, Inc.
Steel City/Midland-Ross Corp.
Thomas and Betts Co., Inc.

PART 3 – EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS

A. Install electrical boxes and fittings, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.

C. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.

D. Provide knockout closures to cap unused knockout holes where blanks have been removed.

E. Install boxes and conduit bodies in those locations to ensure ready accessibility of electrical wiring.

F. Avoid using round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surface.

G. Fasten boxes rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry.

H. Provide electrical connections for installed boxes.

I. Pull boxes and junction boxes shall be furnished and installed in all conduit runs at intervals not exceeding 100 feet maximum.

J. Identify each circuit in all pull boxes and junction boxes whether the box contains one or more circuits.

END OF SECTION 26 01 35

SECTION 26 01 40

WIRING DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of wiring device work is indicated by drawings, schedules and specifications. Wiring devices are defined as single discrete units of the electrical distribution system which are intended to carry but not utilize electric energy.

B. Types of electrical wiring devices in this section include the following:

Receptacles.
Switches.
Device plates.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical wiring devices.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following (for each type of wiring device):

Legrand Co.
Hubbell, Inc.
Leviton Mfg. Co.
Cooper Wiring Devices
Square D Co.
Eaton Corp.
Siemens

2.2 FABRICATED WIRING DEVICES

A. Provide factory fabricated wiring devices, in types, styles, colors, and electrical ratings for applications indicated and complying with NEMA Standards Pub. No. WD 1. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and complying with NEC and NEMA Standards for wiring devices. Provide ivory/brown color devices and wall plates except as otherwise selected; color selection to be verified by Contractor with Architect/Engineer.

2.3 RECEPTACLES

A. Heavy-Duty Simplex: Provide single-duty type receptacles, 2 pole, 3 wire grounding, with green hexagonal equipment ground screw, 20 amperes, 125 volts with metal plaster ears, side wiring, NEMA configuration 5-20R unless otherwise indicated.

B. Heavy-Duty Duplex Standard Style: Provide extra heavy-duty industrial series duplex receptacles, 2 pole, 3 wire grounding type with green hexagonal equipment ground screw, 20 amperes, 125 volts with metal plaster ears, side wiring, NEMA configuration 5-20R unless otherwise indicated. Similar to Hubbell Series HBL Series, or approved substitute.

C. Special Purpose Receptacles: Provide polarized grounding type special purpose receptacles of the required amperage and voltage ratings for the duty intended. Device shall include a green hexagonal equipment ground screw.

D. Ground Fault Receptacle: Provide hospital grade heavy duty duplex receptacle, 2 pole, 3 wire grounding type with green hexagonal equipment, ground screw and integral ground fault circuit interrupter, UL rated Class A, Group 1, 20 amperes, 125 volts, 60 Hertz with metal plaster ears, side wiring, NEMA Configuration 5-20R. Device shall include solid state ground-fault sensing and signalling, with a 5 milliampere ground fault trip level, plus or minus 1 milliampere. Similar to Hubbell Cat. No. GFR8300H Series, or approved substitute.

1. Whether indicated or not on the floor plans, the Electrical Contractor shall furnish and install GFI protected devices in commercial kitchen areas next to lavs, on rooftop equipment, on exterior walls; and as indicated by the N.E.C., it shall be the discretion of the Electrical Contractor to provide GFI receptacles or GFI circuit breaker.

2.4 SWITCHES

A. Toggle Switch: Provide extra heavy duty, industrial series flush toggle, 1 pole, 2 pole, 3-way, 4-way AC quiet switch rated 20 amperes @ 120/277 volts with green hexagonal equipment ground screw, metal plaster earls, and side wired screw terminals. Similar to Hubbell Series HBL Series or approved substitute.

2.5 DEVICE PLATES

A. Provide switch and receptacle outlet wall plates for wiring devices, of types, sizes, and with ganging and cut outs required by the devices being installed. Construct with metal screws for securing plates to devices; screw heads colored to match finish of plates; plates colored to match wiring devices to which attached. Provide device plates possessing the following additional construction features: **Receptacle outlet plates to be permanently marked with panel designation and circuit number on back side of plate.**

1. Metal Plates to be stainless steel of non-corrosive and non-magnetic 302 alloy, .032" nominal thickness. Plates shall have brushed satin finish.

B. Weatherproof device plates shall have spring-hinged waterproof cap suitably configured for each application, including face plate gaskets and corrosion-resistant fasteners. Provide device plates possessing the following construction materials and finishes:

1. Cast Aluminum Plates shall be die-cast, copper-free aluminum construction with a baked-on lacquer finish.

2.6 ENERGY CONTROL DEVICES (Occupancy Sensors)

A. Line Voltage:

1. Combination wall switch and sensor shall be Dual Technology Passive Infrared and Ultrasonic with a coverage of 180° for 20 feet. Device shall be suitable for 120/277 dual voltage operation. Device shall be similar to Sensor Switch Cat. No. WSD-PDT or approved substitute.

2. Ceiling sensor shall be Dual Technology Passive Infrared and Ultrasonic 360° coverage. Self Contained Relay Device shall be suitable for 120/277 Dual Voltage operation. Device shall be similar to Sensor Switch Cat. No. CMR-PDT or approved substitute.

PART 3 – EXECUTION

3.1 INSTALLATION OF WIRING AND CONTROL DEVICES

A. Install wiring devices as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other work, including painting, electrical box and wiring work, as necessary to interface installation of wiring devices with other work.

C. Install wiring devices only in electrical boxes which are clean, free from building materials, dirt and debris.

D. Provide electrical connections for wiring and control devices.

E. Delay installation of all wiring and control devices until wiring work is completed.

F. Isolated Ground Receptacle Devices shall be connected to the system ground by way of an insulated ground conductor color coded green with a yellow stripe.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES

A. At time of Substantial Completion, replace those items which have been damaged, including those burned and scorched by faulty plugs.

3.3 GROUNDING

A. Provide electrically continuous, tight grounding connections for wiring and control devices.

3.4 TESTING

A. Prior to energizing circuitry, test wiring devices for electrical continuity and proper polarity connections. After energizing circuitry, test wiring devices to demonstrate compliance with requirements.

B. After energizing circuitry, the Electrical Contractor shall test and adjust all control devices to provide optimum operation and performance.

END OF SECTION 26 01 40

SECTION 26 01 55

MOTOR STARTERS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of motor starter work is indicated by drawings, schedules and specifications.

B. Refer to sections of other divisions of these specifications for driven equipment specified without motor starters. Motor starters for such equipment are the work of this section.

C. Types of motor starters in this section include the following:

Manual.
Magnetic Full Voltage, Non-Reversing.
Combination Disconnect Switch and Magnetic Starter.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data on motor starters and accessories.

1.3 COORDINATION

A. The drawings and details there upon are scheme and/or diagrammatic in nature, and indicate the need and intent of the design. These are to be used for general guidance only. It shall be the responsibility of the Electrical Contractor to coordinate with other Division subcontractors, the installation of all motor starters, the need for control devices including the wiring and conduit, to and from the device.

B. This coordination shall be carried out prior to actual installation. This shall be done to eliminate the possibility of conflicts between trades on items such as access, clearances and maintenance issues that may arise after completion of coordination.

C. During the coordination phase of the project, the Electrical Contractor shall consult with Division 1 thru 23 subcontractors with regard to base design equipment characteristics. Any differences from the electrical plans and specifications shall be considered a change. The trade's contractor making the change at no additional cost to the Owner or delay in project completion shall handle these additional costs.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following (for each type and rating of motor starter):

Allen-Bradley Co.
Cutler Hammer Products
Furnas Electric Co.
General Electric Co.
Square D Co.
Siemens

2.2 MOTOR STARTERS

A. Provide motor starters and ancillary components; of types, sizes, ratings and electrical characteristics indicated which comply with manufacturer's standard materials, design and construction in accordance with published product information, and as required for complete installations.

B. Fractional HP Manual Motor Starters: Provide manual, single phase, fractional HP motor starters for each motor rated less than 1/2 HP, of types, ratings and electrical characteristics indicated. Equip unit with thermal overload relay for protection of 120 volt AC motors. Provide starters with quick-make, quick-break, trip free toggle mechanisms, selector switches for hand-off-automatic control; mount starter in NEMA Type 1 or Type 4 enclosure as indicated or required by the NEC.

C. Magnetic Motor Starter: Provide magnetic full voltage, non-reversing starters for each motor rated 1/2 HP and more of types, ratings and electrical characteristics indicated; equip with solid state overload relays, control transformers with 120V secondary, with one secondary fuse and one grounded secondary lead, two normally open and two normally closed auxiliary contacts, hand-off- automatic selector switch, red and green pilot lights wired and mounted through front of the enclosure. Mount starter in NEMA Type 1 or Type 4 enclosure as required by the NEC.

D. Combination Disconnect Switch Magnetic Starter: Provide full-voltage, non-reversing, combination non-fused disconnect switch and magnetic starter for each motor rated 1/2 horsepower and more, of types, ratings and electrical characteristics indicated; equip with solid state overload relays, control transformer with 120 volt secondary, one secondary fuse and one grounded secondary lead, two normally open and two normally closed auxiliary contacts, hand-off- automatic switch, red and green pilot lights wired and mounted through the front of the enclosure. Mount starter in NEMA Type 1 or Type 4 enclosure as required by the National Electrical Code (NEC).

E. Three (3) phase, full voltage, non-reversing magnetic motor starters, horsepower rating with minimum NEMA size #0 shall be as follows:

NEMA Size	Continuous Rating	Maximum Horsepower	
		208 Volt	480 Volt
0	18 AMPs	3HP	5HP
1	27 AMPs	7-1/2HP	10HP

2	45 AMPs	10HP	25HP
3	90 AMPs	25HP	50HP
4	135 AMPs	40HP	100HP
5	270 AMPs	75HP	200HP

Motor full-load current shall not exceed continuous ampere rating of starter.

PART 3 – EXECUTION

3.1 INSTALLATION OF MOTOR STARTERS

A. Install motor starters in accordance with manufacture's written instructions, applicable requirements of NEC, NEMA Standards, and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. The Electrical Contractor shall consult and cooperate with the Control Contractor in assisting him in making control connections to the automatic position of the selector switch and to the auxiliary contacts.

C. Motor Data: Before installing wiring for motors and starters, the Electrical Contractor shall consult the respective parties furnishing the equipment and obtain from them all data necessary to properly connect the apparatus, and for selection of thermal overload relays in accordance with motor nameplate. Any variance in loads or electrical characteristics from the contract drawings should be reported to the Engineer before proceeding with the work.

D. When packaged equipment is furnished, all unit starters shall be furnished, mounted and wired by the installing contractor. The Electrical Contractor shall furnish and install a disconnect switch, as specified in Section 260170, and wire between unit's main terminal block and the disconnect switch.

E. When packaged rooftop equipment is furnished, the unit disconnect switch and all starters shall be furnished, mounted and wired by the installing contractor. The Electrical Contractor shall wire between the line side of the disconnect switch and the building system.

F. Provide connections for motor starters.

3.2 ADJUST AND CLEAN

A. Inspect operating mechanisms for malfunctioning and where necessary adjust units for free mechanical movement.

B. Touch-up scratched or marred surfaces to match original finish.

3.3 FIELD QUALITY CONTROL

A. Subsequent to wire/cable hookup, energize motor starters and demonstrate functioning of equipment in accordance with requirements.

END OF SECTION 26 01 55

SECTION 26 01 80

OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of overcurrent protective device work is indicated by drawing schedules and specifications.

B. Types of overcurrent protective devices in this section include the following:

1. Molded case circuit breaker.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data on overcurrent protective devices, including: voltages and current ratings, interrupting ratings, current limitations, internal inductive and non-inductive loads, time-current trip characteristic curves, and mounting requirements.

B. Shop Drawings: Submit layout drawings of overcurrent protective devices, showing spatial relationships of units to associated electrical equipment, and connections to electrical power supplies.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

1. Circuit-Breakers

Cutler-Hammer, Inc. (Eaton)
General Electric Co.
Square D Co.
Siemens

2.2 CIRCUIT BREAKERS

A. Except as otherwise indicated, provide circuit breakers and ancillary components, of types, sizes, ratings and electrical characteristics indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, as required for a complete installation.

B. Molded-Case Circuit Breakers: Provide factory assembled, molded-cased circuit breakers of frame size indicated; 120/208 volts, and 277/480 volts 60 Hertz, one, two, or three poles

with a short circuit symmetrical ampere interrupting rating as indicated by the panel schedule and/or as shown by the single line riser diagram. Provide circuit breakers with permanent thermal instantaneous magnetic trips in each pole with ampere ratings as indicated. Construct with overcenter, trip-free, toggle type operating mechanisms with quick-make, quick- break action and positive handle trip indication. Construct devices for mounting and operating in any physical position and operating in an ambient temperature of 40 degrees C. Provide circuit breakers with mechanical screw type connector lugs, AL/CU rated.

PART 3 – EXECUTION

3.1 INSTALLATION OF OVERCURRENT PROTECTIVE DEVICES

A. Install overcurrent protective devices as indicated in contract documents, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with NEC Standards for Installation of overcurrent protective devices.

B. Coordinate with other work, including electrical wiring work, as necessary to interface installation of overcurrent protective devices with other work.

C. Fasten circuit breakers without causing mechanical stresses, twisting or misalignment being exerted by clamps, supports, or cabling.

3.2 ADJUST AND CLEAN

A. Inspect circuit-breaker operating mechanisms for malfunctioning and, where necessary, adjust units for free mechanical movement.

3.3 FIELD QUALITY CONTROL

A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.

END OF SECTION 26 01 80

SECTION 26 01 90

SUPPORTING DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Types of supports, anchors, sleeves and seals specified in this section include the following:

Hangers.
Riser Clamps.
C-clamps
I-beam clamps.
One-hole conduit straps.
Two-hole conduit straps.
Round steel rods.
Lead expansion anchors.
Toggle bolts.
U-Channel Strut Systems.

PART 2 – PRODUCTS

2.1 MANUFACTURED SUPPORTING DEVICES

A. Provide supporting devices, complying with manufacturer's standard materials, design and construct in accordance with published product information, and as required for a complete installation, and as herein specified.

B. Supports: Provide supporting devices of types, sizes and materials having the following construction features:

Hangers: For supporting EMT conduit, electro-galvanized steel, with 1/4" minimum diameter hole for round steel rod; approximately MSS types 5, 7, 9 or spring steel conduit clips.

Reducing Couplings: Steel rod reducing coupling, 1/4" minimum black steel.

C-Clamps: Black malleable iron, 1/4" minimum rod size.

I-Beam Clamps: Black steel, 1-1/4" x 3/16" stock; 3/8" cross bolt; flange width 2"; approx. 52 pounds per 100 units.

One-Hole Conduit Straps: For supporting EMT conduit, electro- galvanized steel.

Two-Hole Conduit Straps: For supporting EMT conduit, electro-galvanized steel; 3/4" strap width; and 2-1/8" between center of screw holes.

Hexagon Nuts: For 1/4" rod size; galvanized steel.

Round Steel Rod: Black steel; 1/4" min. dia.

Offset Conduit Clamps: For supporting rigid metal conduit; black steel.

C. Anchors: Provide anchors of types, sizes and materials indicated; and having the following construction features:

Lead Expansion Anchors: 1/4" - 20 Minimum .

Toggle Bolts: Springhead; 3/16 x 4".

D. Manufacturer: Subject to compliance with requirements, provide anchors of the following:

Ackerman Johnson Fastening Systems, Inc.
Elcen Metal Products Co.
Ideal Industries, Inc.
Rawlplug Co., Inc.
Star Expansion Co.
U.S. Expansion Bolt Co.
Erico Products, Inc. (Caddy)

E. U-Channel Strut Systems: Provide U-channel strut system for supporting electrical equipment, 16-gauge hot dip galvanized steel, construct with 9/16" dia. holes, 8" o.c. on top surface, with standard hot dip galvanized finish, and with the following fittings which mate and match with U-channel.

Beam clamps.
Thinwall conduit clamps.
Conduit hangers.
U-bolts.

F. Manufacturers: Subject to compliance with requirements, provide channel systems of one of the following:

B-Line Systems, Inc.
Elcen Metal Products Co.
Power-Strut Div.; Van Huffel Tube Corp.
Unistrut Div.; GTE Products Corp.

PART 3 – EXECUTION

3.1 INSTALLATION OF SUPPORTING DEVICES

A. Install hangers and anchors in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA, NEC and ANSI/NEMA for installation of supporting devices.

B. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. Install supports with maximum spacings.

END OF SECTION 26 01 90

SECTION 26 04 71

FEEDER CIRCUITS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Feeder circuit work is indicated by drawings and schedules.

B. The feeder circuits shall include furnishing and installing a complete wire and conduit system between distribution panelboards and major 3 phase loads, between power panels and 3 phase motor loads.

C. Types of equipment to be furnished and installed in this section include the following:

Rigid Metal Conduit
Electrical Metallic Tubing (EMT)
Intermediate Metal Conduit (IMC)
Wires and Cables
Junction Boxes
Pull Boxes
Conduit Bodies
Bushings
Locknuts
Supporting Devices

PART 2 – PRODUCTS

2.1 FEEDER CIRCUITS

A. Furnish and install each feeder circuit with assembly of materials, including but not necessarily limited to, conduit, wire, pull boxes, junction boxes and other items and accessories needed for a complete installation. Where materials or components are not otherwise indicated, comply with NEC, NEMA and established industry standards for applications indicated.

PART 3 – EXECUTION

3.1 INSTALLATION OF FEEDER CIRCUITS

A. Install feeder circuits, complying with equipment manufacturer's written instructions, applicable requirements of NEC, NEMA and NECA's "Standard of Installation", and in accordance with recognized industry practices.

B. Multiple circuits within a single raceway shall not be permitted under this section.

END OF SECTION 26 04 71

SECTION 26 04 72

BRANCH CIRCUITS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Branch circuit work is indicated by drawings.

B. The branch circuits shall include furnishing and installing a complete wire and conduit or cable system between panelboards and lighting fixtures, receptacles, fractional horsepower motors, and small single phase loads.

C. Types of equipment to be furnished and installed in this section include the following:

Rigid Raceways – See Section 260110
Electrical Metallic Tubing (EMT)
MC (Metal Clad) (Concealed Work only)
Wires and Cables
Junction Boxes
Pull Boxes
Conduit Bodies
Bushings
Locknuts
Supporting Devices

PART 2 – PRODUCTS

2.1 BRANCH CIRCUITS

A. Furnish each branch circuit with an assembly of materials, including but not necessarily limited to, conduit, wire, cable, pull boxes, junction boxes and other items and accessories needed for a complete installation. Where materials or components are not otherwise indicated, comply with NEC, NEMA and established industry standards for applications indicated.

2.2 CONVENIENCE BRANCH CIRCUITS

A. Intent:

1. The intent of this portion of the specifications is to describe the requirements of a convenience circuit as it applies to 120-volt receptacles.

2. All convenience branch circuits may consist of more than one 120 volt receptacle.

B. Convenience Circuit - General: A circuit consisting of a phase and neutral conductor, which may share its neutral with other phase conductors provided that the neutral conductor does not become overloaded due to circuit phase relationship. This type of circuit shall also include an equipment grounding conductor as described under the grounding section of the specifications.

C. Convenience Circuit - Dedicated: A circuit consisting of a phase and neutral conductor which DOES NOT share conductors with any other circuits. This type of circuit shall also include an equipment grounding conductor as described under the grounding section of the specifications.

PART 3 – EXECUTION

3.1 INSTALLATION OF BRANCH CIRCUITS

A. Install branch circuits, complying with equipment manufacturer's written instructions, applicable requirements of NEC, NEMA, and NECA's "Standard of Installation", and in accordance with recognized industry practices.

B. Multiple circuits within a single raceway or cable shall be permitted under this section. It shall be the responsibility of the Electrical Contractor to assure that the neutral conductors do not become overloaded due to circuit phase relationship, and isolated grounds not become voided or compromised due to miswiring or wrong connections.

C. The Electrical Contractor may elect to use metal clad cable in lieu of electrical metallic tubing (EMT) in wall cavities, and/or above tile or dry wall ceilings. In all areas of exposed construction, electrical metallic tubing (EMT) shall be installed.

END OF SECTION 26 04 72

SECTION 26 04 75

ELEVATOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Elevator electrical work is indicated by drawings, schedules and specifications.

B. The feeder circuits, branch circuits and fire alarm interface shall include, but not be limited to, furnishing and installing a complete wire and conduit system with required equipment and components. This shall occur between the building's distribution panelboard, branch circuit panelboard, the fire alarm control panel and the elevator equipment, machine room, hoistway and elevator lobby.

C. Types of equipment to be furnished and installed in this section shall include, but not be limited to, the following:

1. Lighting (branch circuits)
2. Power (feeder circuits)
3. Control (fire alarm system)
4. Signal (telephone system) (when required)

PART 2 – PRODUCTS

2.1 LIGHTING

A. Furnish and install within the elevator machine room on strike side of machine room door, a 30 amp, 2 pole fused disconnect switch with conduit and wire to a junction box in the hoistway, final location of junction box shall be as directed by the elevator contractor.

B. The non-fused disconnect switch shall be connected to the local branch circuit panelboard with 2 # 12 + 1 # 12 ground in ¾" conduit. This circuit shall be used to provide service to the elevator car lighting, exhaust fan and any other small loads required by the elevator equipment.

2.2 POWER

A. Furnish and install within the elevator machine room on strike side of machine room door, a 200 amp, 3 pole fused disconnect switch with auxiliary contacts, with conduit and wire to the elevator controller, refer to the single line diagram for conduit and wire size. Fuse type and size shall be as directed by the elevator manufacturer. The auxiliary contacts shall be used to disconnect the control panel's battery backup during maintenance.

B. Furnish and install within the distribution panelboard a 3 pole molded case circuit breaker with a shunt trip device, auxiliary contact and conduit and wire to the elevator disconnect switch. Refer to the single line diagram for the circuit breaker size and type and the conduit and wire size. The auxiliary contacts shall be used to disconnect the control panel's battery backup.

C. Furnish and install a 20 amp, 120 volt, single phase power source for the molded case circuit breaker's shunt trip device from a local branch circuit panelboard.

2.3 CONTROL

A. Furnish and install smoke detectors within areas of the building associated with the elevator as follows:

1.	Elevator Lobbies	one on each level
2.	Hoistway	at the top of the shaft. In addition to the smoke detector, furnish and install a heat detector (when the building is sprinkled).
3.	Machine Room	in addition to the smoke detector, furnish and install a heat detector (when the building is sprinkled).

B. Each elevator lobby, hoistway and machine room smoke detector shall be zoned separately from each other and from the floor detectors. These detectors shall be wired and programmed to form a three (3) circuit control scheme for elevator recall as outlined in the National Fire Alarm Code 3-8.14.6.

C. When the building is sprinkled the elevator machine room and the elevator hoistway shall have a heat detector installed. This detector shall be installed within 2 feet of the sprinkler head in accordance with the National Fire Alarm Code 3-8.15.2. The heat detector shall be furnished based on the Response Time Index (RTI) of both the heat detector and the sprinkler head. This detector shall be wired to the fire alarm control panel to provide for elevator shutdown in accordance with the National Fire Alarm Code 3-8.15.

D. Furnish and install a shunt trip device and auxiliary contact with power source on the elevator molded circuit breaker located in the distribution panelboard. When the building is sprinkled this device shall be wired to the fire alarm control panel in accordance with ANSI/ASME A17.1 – 1996, Rule 102.2 (C) and National Electrical Code 620-51.

SPECIAL NOTE TO DESIGN:

E. If Sprinklers are required for a project in Pennsylvania, a variance must be secured from the Elevator Division of Labor and Industry for the installation of the automatic disconnect device. This variance should be secured by the Architect. If secured by ThyssenKrupp Elevator Corporation, we will bill on a time-and-material basis. The request for variance should include a complete description of the proposed operation.

2.4 COMMUNICATIONS

A. Furnish and install a four (4) pair, Cat 5 cable in ¾" conduit between the telephone terminal backboard and a junction box located in the elevator hoistway. Final location of the junction box shall be as directed by the elevator contractor.

PART 3 – EXECUTION

3.1 INSTALLATION OF ELEVATOR ELECTRICAL SYSTEMS

A. Install equipment and components, complying with equipment manufacturer's written instructions, applicable requirements of the National Electrical Code (NEC), NEMA and NECA's "Standard of Installation", and in accordance with recognized industry practices.

3.2 CONTROL WIRING

A. The Electrical Contractor shall furnish and install all required wiring between the fire alarm control panel and the elevator controller to provide for elevator recall when the building has an alarm condition. This contractor shall consult and cooperate with the elevator installing contractor.

B. The Electrical Contractor shall furnish and install all required wiring between the fire alarm control panel and the smoke detectors in the elevator lobbies, and the smoke and heat detectors in the elevator machine room and hoistway. This contractor shall consult and cooperate with the fire alarm manufacturer in providing the required programming and wiring needed to complete the recall system as required by the Elevator Code, NEC, NFPA and the NATIONAL FIRE ALARM CODE.

C. The Electrical Contractor shall furnish and install all required wiring between the fire alarm control panel and the shunt trip circuit breaker located in the distribution panel. This wiring and programming shall provide for the trip signal from the fire alarm control panel and a supervisory signal to the fire alarm control panel as "TROUBLE" for the loss of the trip power source. This wiring and programming shall be in accordance with the requirements of the NEC and the NATIONAL FIRE ALARM CODE.

3.3 POWER WIRING

A. The Electrical Contractor shall furnish and install an elevator circuit breaker in the distribution panel of the size and type as indicated on the single line diagram. This circuit breaker shall be complete with a shunt trip device rated 120 volt A.C and auxiliary contact. The shunt trip device shall be wired to an external 120 volt power source in a local branch circuit panel with a 20 amp – 1 pole circuit breaker and 2 # 12 + 1 # 12 ground in ¾" conduit. Trip control and supervisory shall be furnished and installed as indicated above under 3.1 paragraph "C".

B. The Electrical Contractor shall furnish and install within the elevator machine room a fused elevator disconnect switch of the size and type indicated on the single line diagram. This disconnect switch shall be furnished with an auxiliary contact and wired to the elevator controller's "optional" battery system for disconnect and shutdown. If the "optional" battery system is not selected then the auxiliary contact remains un-wired. All required wiring shall be in accordance with the requirements of the NEC and the ELEVATOR CODE. The Electrical Contractor shall consult and cooperate with the elevator installer in providing this function.

C. The Electrical Contractor shall furnish and install a 30 amp,1 pole fused disconnect switch within the elevator machine room. This switch shall provide power to the elevator car

lighting and exhaust system, the switch shall be connected to the elevator equipment in accordance with the elevator contractor's requirements. The switch shall be connected to a local branch circuit panel with a 20 amp – 1 pole circuit breaker and 2 # 12 + 1 # 12 ground in ¾" conduit.

3.4 COMMUNICATION WIRING

A. The Electrical Contractor shall furnish and install one (1) four pair, CAT-5 cable in ¾ " conduit between the elevator equipment and the building's telephone system. The Electrical Contractor shall consult and cooperate with the Elevator Contractor in making this connection.

END OF SECTION 26 04 75

SECTION 26 05 10

BUILDING LIGHTING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Lighting fixture work is indicated by specifications, drawings and schedules.

B. Types of lighting fixtures in this section include the following:

1. Fluorescent.
2. Incandescent.
3. High Intensity Discharge.
4. LED

C. Applications of lighting fixtures required for the project include the following:

1. General Lighting.
2. Supplementary Lighting.
3. Emergency Lighting.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data on building lighting fixtures.

B. Shop Drawings: Submit dimensioned drawings of lighting fixture installations, including but not necessarily limited to, layout, relation to associated panelboards, and connections to panelboards. Submit fixture shop drawings in booklet form with separate sheet for each fixture, assembled in luminaire "type" alphabetical order, with proposed fixture and accessories clearly indicated on each sheet.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with project specifications and requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Refer to "Lighting Fixture Schedule", on the drawings, for fixture types and acceptable manufacturers.

B. Each lighting fixture type specified represents a specific style and quality of fixture acceptable for this project. Equivalent manufacturers listed are consider to have lighting fixtures which meet or exceed those of the originally specified manufacturer.

C. The Engineer reserves the right to reject any shop drawing and to request a resubmission should the contractor submit a shop drawing of an equivalent manufacturer which is viewed as being of an incompatible style or inferior quality.

D. No fixture shop drawing shall be submitted, nor will any be accepted, for any manufacturer which is not specifically listed for that fixture type. When a fixture manufacturer is listed for a specific fixture type, this does not provide him with the right to submit for fixtures he is not listed under. A bidding Contractor may elect to submit non listed fixtures for the Engineer's review, a minimum of ten (10) working day prior to bid, if the Engineer agrees that the submitted fixture meets the intended design than a written addendum will be issued, if no addendum is issued than the manufacturer shall not submit shop drawings for that fixture type. The Engineer, and only the Engineer shall make the final decision on whether the submitted fixture meets the project's requirements.

E. Should the Contractor be unable to obtain approval of the resubmitted manufacturer, than he should submit a fixture from one of the other equivalent manufacturers listed or from the originally specified manufacturer.

2.2 LIGHTING FIXTURES

A. Provide lighting fixtures of the size, type and rating indicated complete with, but not necessarily limited to, housings, lamp holders, reflectors, ballast, lamps, mounting frames, pendants and wiring; wired and connected in place, complete, tested and left in satisfactory operating condition.

B. Fluorescent Lamp Ballasts:

<u>Section 1 - Physical Characteristics</u>

1. The ballast shall be physically interchangeable with a standard core & coil electromagnetic ballast.

2. The electronic ballast shall be provided with integral leads, color coded to ANSI standard C82.11 (latest version).

<u>Section 2 - Performance Requirement</u>

1. The "High Frequency" electronic ballast shall operate lamps at a frequency of 20 KHz or higher without visible flicker.

2. The electronic ballast's input current shall have Total Harmonic Distortion (THD) of less than 20% when used with primary lamp.

3. The electronic ballast shall have a Power Factor greater than 98% when used with primary lamp.

4. The electronic ballast shall have Lamp Current Crest Factor of less than 1.7, in accordance with lamp manufacturers' recommendations and ANSI C82.11.

5. The electronic ballast shall support a sustained short to ground or open circuit of any output lead without damage to the ballast.

6. The electronic ballast shall have an audible noise rating of Class A or better.

Section 3 - Regulatory Requirements

1. Ballast shall meet the requirements of the Federal Communications Commission Rules and Regulations, Part 18, for non-consumer equipment.

2. The electronic ballast shall meet ANSI C82.11 standards regarding harmonic distortion.

3. Ballast shall meet ANSI C62.41 Cat. A for transient protection.

4. The electronic ballast shall comply with all applicable state and federal efficiency standards.

5. The electronic ballast shall be Underwriters' Laboratories (UL) listed (Class P) and CSA Certified where applicable.

Section 4 - Other

1. The electronic ballast shall not contain Polychlorinated Biphenyls (PCB's).

2. The electronic ballast shall carry a five year (5) warranty.

C. High Intensity Discharge Ballasts

Section 1 - Physical Characteristics

1. The ballast shall be either a open core and coil mounted within the fixture or an encapsulated core and core.

2. With both types the capacitor and the igniter are mounted separately within the fixture.

Section 2 - Performance Requirement

1. Where quiet performance is required the standard open core and coil shall be potted in a cube-shaped steel can utilizing Class H (180 Deg. C.) polyester compound.

2. Encapsulated ballasts shall carry a Class A noise rating up through 175 watts and Class B for 250 and 400 watts.

3. The ballast shall be designed with multiple input voltage taps on the primary coil. The four (4) tap design shall operate on 120 volt, 208 volt, 240 volt and 277 volt.

Section 3 - Regulatory Requirements

1. Ballast shall be Underwriters' Laboratories (UL) listed in accordance with UL 1029.

2. Ballast shall be designed and manufactured in accordance with ANSI C82.4.

D. Fixture Lamps: For the type, number and color of the fixture lamps, refer to the Lighting Fixture Schedule on the drawings.

PART 3 – EXECUTION

3.1 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation", NEMA Standards and with recognized industry practices to ensure that lighting fixtures fulfill requirements of the project.

B. Install lighting fixtures in removable tile ceilings using 3/8" flexible metal conduit with 3 # 12 awg. conductor. Maximum length of flexible lead shall not exceed 60". Flexible lead shall extend from the fixture to the junction box. The junction box shall be securely fastened to the building structure above the removable tile ceiling and shall not serve more than two (2) lighting fixtures, nor shall the junction box support any of the lighting fixtures.

3.2 LIGHTING FIXTURE MOUNTING

A. 1' x 4', 2' x 2' and 2' x 4' fluorescent fixtures installed in a removable tile ceiling shall be installed using T-Bar grid safety clips as provided by the fixture manufacturer and as required by the NEC.

B. 2'x 2' and 2' x 4' fluorescent fixtures installed in a removable tile ceiling shall be installed using support wires at all four corners of the fixture. The support wires shall be carried up to the building structure and securely anchored using screwed or bolted hardware. Pressure type clips will not be acceptable. The Electrical Contractor shall be responsible for installing or having installed these four (4) support wires.

C. 1' x 4' fluorescent fixtures installed in a removable tile ceiling shall be installed using support wires at two (2) corners of the fixture. The support wires shall be carried up to the building structure and securely anchored using screwed or bolted hardware. Pressure type clips will not be acceptable. The Electrical Contractor shall be responsible for installing or having installed these Two (2) support wires.

D. Incandescent and fluorescent downlights installed in a removable tile ceiling shall be installed using 24" spreader bars attached to the T-Bar grid system. Two (2) support wires shall be installed, one (1) on each side of the fixture and centered between the spreader bars, these support wires shall be carried up to building structure and securely anchored using screwed or bolted hardware. Pressure type clips will not be acceptable. The Electrical Contractor shall be responsible for installing or having installed these two (2) support wires.

E. Pendant lighting fixtures, either chain, cable or stem hung below a removable tile ceiling shall be installed in accordance with fixture manufacturer's written instructions and recommendations. The Electrical Contractor shall furnish and install support wire or threaded rod from the fixture mounting hardware up to building structure and securely anchor using screwed or bolted hardware. Pressure type clips will not be acceptable. These

support devices shall be independent from the ceiling T-Bar grid system, the system may be used as a guide, but in no way shall the T-Bar grid system carry any of the weight produced by the fixture or it's support devices.

F. Surface mounted fixtures installed on removable tile ceilings or dry wall ceilings shall be installed in accordance with fixture manufacturer's written instructions and recommendations.

1. Fixtures installed on removable tile ceilings shall be anchored to the T-Bar grid system using snap-on clips with threaded studs and wing nuts. The Electrical Contractor shall furnish and install a support wire from each snap-on clip carried up to building construction and securely anchor using screwed or bolted hardware.

2. Fixtures installed on dry wall ceilings shall be mounted using spring-loaded toggle bolts. The number and location of the anchors shall depend on the fixture manufacture's written instructions and recommendations. It shall be the responsibility of the Electrical Contractor to follow these instructions and recommendations.

3.3 ADJUST and CLEAN

A. Clean lens, reflectors and interiors of all lighting fixtures of dirt and construction debris upon completion of installation.

B. Protect installed lighting fixtures from damage during the remainder of the construction period.

3.4 FIELD QUALITY CONTROL

A. Upon completion of the installation of the lighting fixtures, and after the building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with project requirements. Where possible, correct malfunctioning units at the site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

B. At the time of Substantial Completion, replace lamps in lighting fixtures which are observed to be noticeably dimmed after Contractor's use and testing, as judged by the Architect/Engineer. Furnish stock or replacement lamps amounting to 15% (but not less than one (1) lamp in each case) of each type and size used in each type of fixture. Deliver the replacement stock as directed to the Owner's storage area.

1. Refer to Division 1 sections for the replacement/restoration of lamps in lighting fixtures, where used for temporary lighting prior to the time of Substantial Completion.

C. Replace defective and burned out lamps for a period of one (1) year following the time of Substantial Completion.

3.5 GROUNDING

A. Provide tight equipment grounding connections for each lighting fixture installation, in accordance with fixture manufacturer's recommendations and the NEC's requirements.

END OF SECTION 26 05 10