Project Manual
Project Number: 17-006

Duneland School Corporation
2017 Mechanical Renovations at:
Jackson Elementary School, 811 N. 400E, Valparaiso, Indiana 46383

For

Board of School Trustees
Duneland School Corporation
601 West Morgan Avenue
Chesterton, Indiana 46304

Issued for Bid and Permit: March 9, 2017

ARCHITECTURE
West Suburban Office: 901 McClintock Drive, Suite 100, Burr Ridge, Illinois 60527
South Suburban Office: 1820 Ridge Road, Suite 209, Homewood, Illinois 60430
Company Main: 630.455.4500 Fax: 630.455.4040
www.TriaArchitecture.com

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SECTION 00030

NOTICE TO BIDDERS

ADVERTISEMENT FOR BIDS

1.1 BID INFORMATION

A. Notice is hereby given that sealed bids will be received by the Board of School Trustees of the Duneland School Corporation on March 23, 2017 until 11:00 a.m. CST (local time) for the: 2017 Mechanical Renovations at Jackson Elementary School. Bids will be opened and publicly read aloud at the Duneland School Corporation Administration Office, 601 West Morgan Avenue, Chesterton, Indiana 46304.

B. A Mandatory Pre-Bid Conference will be held on March 16, 2017 at 3:00 p.m. CST (local time) at Jackson Elementary School, 811 N. 400E, Valparaiso, Indiana 46383. All Bidders are required to attend and sign in at the meeting, which will also be attended by the Owner, Architect and Engineer. A walk-through of the school will immediately follow the pre-bid meeting.

C. Anticipated Award of Contract date: April 10, 2017.

D. Anticipated Start of Construction: June 1, 2017.

E. Anticipated Substantial Completion date: August 9, 2017.

F. Lump sum bid proposals will be received for this project at the scheduled time. Bids received after this time shall be returned unopened.

G. Bid security in the form of a bid bond or certified check in an amount equal to 10 percent of the base bid amount shall be submitted with the bid. Should a bid bond be submitted, the bid bond shall be payable to the Duneland School Corporation.

H. Bids shall be submitted on or before the specified closing time in an opaque sealed envelope addressed to: Mr. Greg Lindy, Director of Support Services, 601 W. Morgan Avenue, Chesterton, IN 46304, ATTENTION: 2017 MECHANICAL RENOVATIONS BID – JACKSON ELEMENTARY SCHOOL.

I. The Board of School Trustees of the Duneland School Corporation reserves the right to reject any or all bids or parts thereof, or to waive any irregularities or informalities, and to make the award in the best interest of the Duneland School Corporation. No bid shall be withdrawn for a period of sixty (60) days after the scheduled bid opening date.

J. All bidders must comply with all Board of School Trustees local policies as outlined in the bidding documents.

K. The Architect for the above referenced project is Tria Architecture, Inc., (630) 455-4500.

L. Bidding documents are on file and may be obtained upon receipt of deposit in the amount of $100 for 1 set of the bidding documents consisting of 2 sets of plans, 2 Project Manuals, 1 Compact Disc containing PDF files of drawings and project manual, and 1 set of bid forms from: GRI Gill Repographics, Inc. 17W715 Butterfield Road, Suite B, Oakbrook Terrace, IL 60181, (630) 652-0800, www.gillrepro.com , chicagoorders@gillrepro.com.

Board of School Trustees of the Duneland School Corporation
601 Wes Morgan Avenue
Chesterton, Indiana 46304

END OF SECTION

SECTION 00100

INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

1.1 **PROPOSAL**

A. The Board of School Trustees of the Duneland School Corporation will receive sealed bids for the 2017 Mechanical Renovations at Jackson Elementary School.

B. To receive full consideration bids must contain the following documents properly completed and signed:
   1. Bid Form.
   2. Bid Bond.
   3. Addendum to Contract for Construction.
   4. Certification Regarding Investment Activities in Iran.
   5. Contractor's Bid for Public Work - Form 96.
   6. Responsible Bidder Form.
   7. Fully completed AIA document A305 providing the Contractor's qualifications and references.

1.2 PREPARATION FOR BIDS

A. Proposals to be entitled for consideration must be made in accordance with the following instructions.
   1. Submit one copy of bid on forms provided by the Architect with all blank spaces for bid prices filled in, in ink, or typewritten.
   2. Submit one reproduction of bid forms and associated documents.
   3. Submit bid in an opaque, sealed envelope, addressed to: Mr. Greg Lindy, Director of Support Services, 601 West Morgan Avenue, Chesterton, Indiana 46304.
      a. Mark the envelope ATTENTION: 2017 Mechanical Renovations - BID.
   4. Sealed Bids will be received until 11:00 a.m. CST (local time), on March 23, 2017 for all specified work at Duneland School Corporation Administration Office, 601 West Morgan Avenue, Chesterton Indiana 46304.
   5. Bids received after this time shall be returned unopened.
   6. Erasures or written memorandum on the Bid Form are prohibited. Include additional explanations, statements, or qualifications in a separate sheet attached to the Bid Form.
   7. The Base Bid shall appear only where called for in the Bid Form and shall not appear elsewhere in the proposal. Any Alternate prices (other than those set forth in the Bid Form) shall be listed on the Substitution Sheet.
   8. Fill in all blank spaces for the bid items with prices, or if not applicable, the words "No Bid."

B. The Owner reserves the right to reject any or all bids or parts thereof at its sole discretion.

C. The Owner reserves the right to waive any or all irregularities or informalities.

D. The Owner reserves the right to terminate this request for bids at any time in the bidding process.

E. All costs associated with developing or submitting a bid in response to this request, or to obtain oral or written clarification of its content shall be borne by the respondent. The Owner and Architect, and their agents, assume no responsibility for these costs. This request for bids does not commit the Owner or Architect, or any of their agents, to pay any costs incurred in the preparation or submission of a bid.

F. Do not detach Bid Proposal Forms from the Project Manual for use in submission of bids; use separate forms furnished by the Architect.

G. Telegraphic bids will not be accepted, but modifications by telegram of bids already submitted will be considered if received prior to the scheduled closing time for receiving bids.

1.3 DEFINITIONS

A. All definitions set forth in the General Conditions of the Contract for Construction as printed in AIA Document A201 as modified and included herewith are applicable to these Instructions to Bidders.

B. Bidding Documents include the Advertisement to Bid, Instructions to Bidders, the Bid Proposal Form and required attachments, AIA Document A101 Standard Form of Agreement Between

Owner and Contractor where the Basis of Payment is a Stipulated Sum, 2007 edition, including General Conditions as modified for this project, AIA Document A305, and the proposed Contract Documents including any addendum issued prior to receipt of bids.

C. Addenda are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the bidding documents, including Drawings and Specifications, by additions, clarifications, or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.
   1. Addenda will be issued by Email, FAX transmittal, direct mail or United Parcel delivery. Bidders are to consider all addenda, regardless of method of transmittal, as a binding modification to the contract documents.
   2. It is the bidder's responsibility to ascertain from the Architect that they have received all addenda issued to the bidding documents prior to submitting their bids.

1.4 DOCUMENTS

A. The Bidding Documents are on file and may be examined at Gill Reprographics, Inc. (GRI), 17W715 Butterfield Road, Suite B, Oak Brook Terrace, IL 60181, (630) 652-0800, www.gillrepro.com.

B. General Contractors may obtain (1) set of the Bidding Documents, consisting of (2) sets of drawings, (2) project manuals, (1) Compact Disc containing PDF files of the drawings and the project manual, and (1) set of bid forms at Gill Reprographics, Inc. (GRI), 17W715 Butterfield Road, Suite B, Oak Brook Terrace, IL 60181, (630) 652-0800, www.gillrepro.com, upon deposit of a check in the amount of $100.00 made payable to the Duneland School Corporation. Deposit is refundable if a bid is submitted and if drawings are returned in good condition by April 23, 2017, as well as to the winning bidder.

C. Contractors may obtain additional sets of plans and specifications directly from the Printer. Contractor shall be responsible for the reproduction costs. Amounts paid for additional sets are not refundable.

D. All documents furnished for bidding purposes (including Compact Disc), obtained by deposit or purchase MUST BE RETURNED to the Printer, transportation prepaid, within ten days after opening of the Bids or deposit checks will not be returned.

1.5 EXAMINATION OF DOCUMENTS AND SITE

A. Bidders are responsible for examining all documents on file at the office of the Printer or Owner and must make a mandatory site visit to examine the site to become familiar with and make allowance for any conditions which may affect the work. Contractors will not be given extra payments for conditions which can be determined by examining the site and documents.

B. A mandatory Pre-Bid Conference will be held on March 16, 2017, 3:00 p.m. at Jackson Elementary School, 811 North 400E, Valparaiso, Indiana 46383. All Bidders are required to attend and sign in at the conference which will also be attended by the Owner, the Architect, and the Engineer. There will be a walk-through of the school to immediately following the pre-bid meeting. The Architect will transmit to prospective bidders of record any Addenda the Architect considers necessary in response to questions arising at the conference.

1.6 POST-BID QUALIFICATION

A. Any bidder may be required to submit supporting data to substantiate that such bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

1.7 BID WITHDRAWAL

A. Any bidder may withdraw their bid prior to the scheduled closing time for receiving bids. All bidders shall hold their Bids open for a period of sixty calendar days from the date of Bid Opening. The Owner and Bidders may agree to extend the period of irrevocability beyond the sixty-day period.

1.8 INTERPRETATION OF BIDDING DOCUMENTS

A. Submit all questions regarding the Bidding Documents to the Architect. Replies will be issued to all bidders of record in the form of an Addendum. Questions received less than five days before the bid opening date cannot be answered.

1.9 NON-SPECIFIED ITEMS

A. Approved Equal Items:
   1. To obtain approval to use non-specified items, submit written request at least five days prior to the opening date; requests received after this time will NOT be considered.
   2. Requests shall clearly describe the items for which approval is asked including all data necessary to demonstrate acceptability.
   3. If an item is acceptable, the Architect will approve same in an Addendum issued to all bidders of record.

B. Substitutions:
   1. Substitutions for the items specified may be made by the Contractor only by submitting proposed substitutions on the Substitution Sheet provided.
   2. Requests received after bid opening will not be considered except for the following conditions:
      a. Product discontinued.
      b. Insufficient quantity. Except the following will not establish cause for substitution:
         1) Failure to award subcontract in sufficient time, or failure to place orders for products so as to ensure delivery without delaying work.
      c. Delays beyond control, such as strikes, lockouts, storms, fires, or acts of God, which may preclude the procurement and delivery of products for purposes of the Project.

C. No consideration will be given to substitutions after the Contractor submits the Schedule of Values.

1.10 METHOD OF AWARD

A. If the Owner should award a Contract, the Owner will award it to the lowest responsible bonafide Bidder with full consideration given to Contractor's Completion Schedule.

B. In determining the lowest responsible bona fide Bidder and in awarding a contract, the Owner may take into consideration skill, facilities, capacity, experience, ability, responsibility, previous work, financial standing of bidder, amount of work being carried on by bidder, quality and efficiency of construction equipment proposed to be furnished, period of time within which proposed equipment is furnished and delivered, and necessity of prompt and efficient completion of work herein described.

1.11 PROPOSAL REQUIREMENTS

A. Bidder's proposals shall be expressly based on the following items:
   1. Instructions to Bidders.
   2. Bid Proposal Form.
   3. General Conditions.
   4. Plans and Specifications.
   5. Addenda

B. Any Contract resulting from the Bidding Documents will incorporate the terms and provisions of said documents. It is intended that these Bidding Documents shall prevail over conflicting terms and conditions of Contractor's proposal. Bidder's printed terms and conditions are NOT considered as exceptions to the Contract.

1.12 BID SECURITY

A. Accompany bids with a Bid Bond, Certified Check or Bank Draft for an amount of Ten Percent of the Base Bid as a guarantee that, if award is made, the bidder will sign the agreement and furnish the required bonds within five days or forfeit his bid security as liquidated damages, but not as a penalty. Execute Bid Bond on A.I.A. Form A-310, current edition or on form furnished by the Architect.

1. Make Bid Security payable to: Duneland School Corporation.

B. Where a bid bond is given as the bid security, the bid bond must comply with the rating level required for the performance and payment bond as stated in section 11.4 of the AIA document A201 included in specification section 00700.

C. The bid security of all except the three lowest bidders will be returned within five days after the award of the Contract.

D. The bid security of the successful bidder and the two other bidders will be returned promptly after the Owner and the accepted bidder have executed the agreement, and the appropriate bonds and certificates of insurance have been provided by the successful bidder. Bid security of the other Contractor's will be returned promptly after agreement is finalized.

1.13 PERFORMANCE ASSURANCE

A. Accepted Bidder: Provide a Performance and Labor and Material/Payment bond.
   1. Provide a 100 percent Performance Bond on AIA A312.
   2. Provide a 100 percent Payment Bond on AIA 312.
   3. Deliver bonds within 3 days after execution of the Contract.

1.14 OTHER CERTIFICATIONS AND SUBMITTALS

A. All bidders must complete and sign the following certifications and submit them with their bid proposals. FAILURE TO DO SO MAY RESULT IN DISQUALIFICATION OF BIDDER.
   1. Addendum to Contract for Construction.
   2. Certification Regarding Investment Activities in Iran.
   3. Contractor’s Bid for Public Work - Form 96.
   4. Responsible Bidder Form.
   5. Fully completed AIA document A305 providing the Contractor’s qualifications and references.

1.15 POWER OF ATTORNEY

A. Attorneys-in-Fact who sign bonds, Agreements or bids must file with each such document a certified and effectively-dated copy of their Power of Attorney.

1.16 EMPLOYMENT AND LABOR PROVISIONS

A. The Contractor must comply with all Board of School Trustees local policies as outlined in the bidding documents. See Document 00820 – Duneland School Corporation Responsible Bidder Form.

B. Vendors/Contractors must conform to all federal, state, local and OSHA Regulations now in effect.

C. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin.

END OF SECTION

SECTION 00300

BID FORM

THE PROJECT AND THE PARTIES

1.1 NAME OF BIDDER: _____

1.2 TO: MR. GREG LINDY, DIRECTOR OF SUPPORT SERVICES
DUNELAND SCHOOL CORPORATION
601 WEST MORGAN AVENUE
CHESTERTON, INDIANA 46304

A. We as contractor having familiarized ourselves with local conditions affecting the work and with the proposed Contract Documents on file at the office of the Owner, hereby propose to perform everything required to be performed and to provide all of the labor, materials, necessary equipment and all utilities and transportation and services necessary to perform and complete in a workmanlike manner all work required to complete the proposed work indicated in the bidding documents for the construction of the 2017 Mechanical Renovations at Jackson Elementary School, all in accordance with the Drawings and Specifications prepared by the office of Tria Architecture, Inc. including Addenda No. _____, _____ and _____ issued thereto for the sum of:

1. Base Bid for all Work:

   _____

   _____

   ($ ___ ___ ___ , ___ ___ ___ , ___ ___ ___ . ___ ___)

2. The base bid consists of all Work specified and required by the proposed Contract Documents.

B. Alternate Bids: The undersigned hereby states the net amount of increase or decrease to the Lump Sum Base Bid for the following Alternates as described in Section 01230.

   ALTERNATE NO. 1: **New Corridor Ceilings and Light Fixtures**

   ADDED from the Lump Sum $_____.

C. Accompanying this proposal is a Bid Security payable to the Duneland School Corporation, which is agreed will be forfeited to the aforementioned as liquidated damages if the undersigned fails to execute the standard form of Owner/Contractor Agreement (AIA Document A101, 2007 Edition, as modified), which is included herein, and furnish evidence of their ability to become bonded and to provide insurance coverage as specified, within five days after notification of the Intent to Award Contract to the undersigned.

D. In signing and submitting this Bid, the undersigned certifies that all materials and construction to be provided are as indicated in the proposed Contract Documents.

E. Time of Completion: If awarded the Contract, the bidder agrees to complete all Construction Work and achieve Substantial Completion by August 9, 2017, 5:00 p.m. NOTE: Substantial Completion for this project refers to all work being a minimum of 99% complete. Final Completion for this project refers to all scheduled work, punch-list and closeout items being 100% complete.

F. The space below of the desired Substantial Completion Date has been left blank for insertion of Contractor's own desired Substantial Completion Date, if he feels that the desired date as stated in the specifications cannot be met. Insertion of a date by the bidder does not change the specified Substantial Completion Date unless the Owner chooses to accept the bidder's date when awarding the contract.
   1. Specified Substantial Completion Date: August 9, 2017, 5:00 p.m.
   2. Contractor's Desired Substantial Completion Date: _____.

SECTION 00300

BID FORM

G. Base Bid Breakdown: For the purpose of logical comparison of orders of magnitude in the bids, the Owner requires a global breakdown of the components of the base bid. Contractors are required to provide this breakdown. Failure to do so will subject the bid to rejection. The sum of the following items must equal the Lump Sum Base Bid.

BREAKDOWN:

Division 01:	General Requirements – Allowances:	$
Division 01:	General Requirements – O&P:	$
Division 01:	General Requirements – Remaining Items:	$
Division 07:	Thermal and Moisture Protection:	$
	Subcontractor (Legal Name, Address):	
Division 15:	Mechanical - HVAC:	$
	Subcontractor (Legal Name, Address):	
Division 15:	Mechanical - Plumbing:	$
	Subcontractor (Legal Name, Address):	
Division 16:	Electrical:	$
	Subcontractor (Legal Name, Address):	
Division 16:	Electrical – Fire Alarm:	$
	Subcontractor (Legal Name, Address):	
Division 16:	Electrical – Low Voltage:	$
	Subcontractor (Legal Name, Address):	
Division 17:	Building Automation System:	$
	Subcontractor (Legal Name, Address):	
Miscellaneous	Any items not identified above:	$
	Subcontractor (Legal Name, Address):	

TOTAL (Should equal base bid): $

SECTION 00300

BID FORM

FIRM NAME: _____

OFFICIAL ADDRESS: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

By: _____ Date: _____
(Signature)

_____
(Printed/Typed Name and Title)

Where the Bidder is a corporation, add Attest

_____ (SEAL)
Secretary (signature) Date

CERTIFIED OR CASHIERS CHECK, BID BOND, OR BANK DRAFT ENCLOSED IN THE FOLLOWING AMOUNT: $_____.

END OF BID FORM

SECTION 00410

BID BOND

1.1 BID BOND INFORMATION

A. KNOW ALL MEN BY THESE PRESENTS, THAT WE _____ as Principal, hereinafter called the Principal, and _____ a corporation duly organized under the laws of the State of Illinois as Surety, are held and firmly bound unto _____ as Obligee, hereinafter called Obligee, in the sum of _____ Dollars ($_____), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

B. WHEREAS, the Principal has submitted a bid for: 2017 Mechanical Renovations at Jackson Elementary School.

C. NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

D. The bid bond must comply with the rating level required for the performance and payment bond as stated in section 11.4 of AIA document A201.

Signed and sealed this _____ day of _____.

_____
(Principal) (SEAL)

_____ _____
(Witness) (Title)

_____
(Surety) (SEAL)

_____ _____
(Witness) (Title)

SECTION 00440

SUBSTITUTION SHEET

1.1 SUBSTITUTION INFORMATION

A. All bids shall be based upon the provisions of the proposed Contract Documents.

B. Bidders desiring to make substitutions for "proprietary brands" specified shall list such proposed substitutions below, together with the amount to be added or deducted from the amounts of their base bids.

C. The Owner reserves the right to reject all such substitutions, and such substitutions will not be used to determine the low bid.

D. Complete descriptions and technical data shall accompany all proposed substitutions.

E. NOTE: Manufacturer's names and material approved by the Architect during the bidding time, but not shown in Addenda, must be listed below if said material is to be considered.

F.

	BRAND/MAKE SPECIFED	PROPOSED	ADD	DEDUCT
1.	_____			
2.	_____			
3.	_____			
4.	_____			
5.	_____			
6.	_____			
7.	_____			
8.	_____			
9.	_____			
10.	_____			
11.	_____			

NAME OF BIDDER: _____

DATE: _____.

END OF SECTION

SECTION 00495

ADDENDUM TO CONTRACT FOR CONSTRUCTION

This following Addendum to THE Contract for Construction is made by _____ ("contractor") and the Duneland School Corporation ("School Corporation") this ___ day of _____, _____..

The contractor is party to a Contract for Construction with the School Corporation ("Agreement").

The contractor states that it is in compliance with the requirements of Indiana Code 22-5-1.7-11 in that it uses the E-Verify program, as such is defined by Ind. Code 22-5-1.7-3, as such may be amended from time to time, or that it is no longer required to verify the work eligibility status of all newly hired employees if the E-Verify program no longer exists.

Attached to this Addendum is an Affidavit signed on behalf of the contractor and executed in accordance with Ind. Code 22-5-1.7-11(b).

This Addendum is intended to supplement the Agreement between the School Corporation and the contractor, whether oral or in writing.

CONTRACTOR

By: _____

Its: _____

SECTION 00495

ADDENDUM TO CONTRACT FOR CONSTRUCTION

STATE OF INDIANA)
)
COUNTY OF _____)

AFFIDAVIT

The undersigned, being duly sworn upon his oath, does state as follows:

1. He/she is _____ (specify position) of _____ ("contractor") and has personal knowledge of the facts set forth in this Affidavit.

2. The contractor provides services to the Duneland School Corporation.

3. The contractor does not knowingly employ any unauthorized aliens, as such term is defined by Indiana Code 22-5-1.7-9.

4. This Affidavit is made for the purpose of complying with the requirements of Indiana Code 22-5-1.7 et seq.

Dated this ___ day of _____, _____.

Further Affiant sayeth not.

_____

I affirm, under the penalties for perjury, that the foregoing representations are true to the best of my knowledge and belief.

_____

SECTION 00496

CERTIFICATION REGARDING INVESTMENT ACTIVITIES IN IRAN

The CONTRACTOR certifies to the Duneland School Corporation ("OWNER"), as a condition of its contract with the School Corporation that CONTRACTOR is not engaged in investment activities in Iran. Pursuant to Ind. Code §5-22-16.5-8, a firm is considered to be engaging in investment activities with Iran if: (1) it has provided goods or services of Twenty Million Dollars ($20,000,000.00) or more in value in the energy section of Iran, including oil or liquefied natural gas; or (2) has extended Twenty Million Dollars ($20,000,000.00) or more in credit to another party, for 45 days or more, if that other party will use the credit to provide goods or services in the energy section in Iran and is, at the time credit is extended, identified on the list developed by the State of Indiana of parties it has determined to be engaged in investment activities in Iran. Be advised that the CONTRACTOR is not listed on the list published and/or endorsed by the State of Indiana pursuant to Ind. Code §5-22-16.5-9 as a company engaged in investment activities with Iran.

Dated this _____ day of _____, 201__.

CONTRACTOR:

By: _____

Its: _____

CONTRACTOR'S BID FOR PUBLIC WORK - FORM 96

State Form 52414 (R2/2-13)/ Form 9B (Revised 2013)
Prescribed by State Board of Accounts

PART I
(To be completed for all bids. Please type or print)

Date *(month, day, year):* _____

1. Governmental Unit (Owner): _____

2. County: _____

3. Bidder (Firm):_____

   Address: _____

   City/State/ZIP code: _____

4. Telephone Number: _____

5. Agent of Bidder *(if applicable)*: _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of _____
(Governmental Unit) in accordance with plans and specifications prepared by _____

_____ and dated _____ for the sum of

_____$_____

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of 1he contract.

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-6-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ACCEPTANCE

The above bid is accepted this _____ day of _____, _____, subject to the following conditions: _____
_____

Contracting Authority Members:

_____ _____

_____ _____

_____ _____

PART II
(For projects of $150,000 or more - IC 36-1-12-4)

Governmental Unit: _____

Bidder (Firm): _____

Date *(month, day, year):* _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Expected Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

_____

_____

_____

4. List references from private firms for which you have performed work.

_____

_____

_____

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work. (Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)

_____

_____

_____

_____

_____

2. Please list the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

_____

_____

_____

_____

_____

3. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

_____

_____

_____

_____

_____

4. What equipment do you have available to use for the proposed project? Any equipment to be used by subcontractors may also be required to be listed by the governmental unit.

_____

_____

_____

_____

_____

5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which would corroborate the prices listed.

_____

_____

_____

_____

_____

SECTION Ill CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

SECTION IV CONTRACTOR'S NON- COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to include anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee, gift, commission or thing of value on account of such sale.

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES FOR PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT.

Dated at _____this _____ day of _____, _____

_____
(Name of Organization)

By _____

_____
(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) ss
COUNTYOF_____)

Before me, a Notary Public, personally appeared the above-named _____ and swore that the statements contained in the foregoing document are true and correct.

Subscribed and swom to before me this _____day of _____, _____.

_____
Notary Public

My Commission Expires: _____

County of Residence: _____

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

Part of State Form 52414 (R2/2-13) **/** Form 96
(Revised 2013)

BID OF

_____

(Contractor)

_____

(Address)

FOR

PUBLIC WORKS PROJECTS

OF

_____

_____

_____

Filed
_____
_____

Action taken
_____
_____

SECTION 00700

GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

1.1 AIA Document A201, General Conditions of the Contract for Construction, 2007 Edition, attached, is the General Conditions between the Owner and Contractor.

1.2 A Letter of Intent to Award a Construction Contract will be issued to the approved contractor upon approval of the Owner. This Letter of Intent shall serve as the Notice to proceed and the Contract for Construction, with all the terms and conditions referenced in the contract documents, until the contract, referenced above, has been fully executed. The awarded contractor shall begin all construction services as specified upon receipt of this Letter of Intent.

END OF SECTION

DRAFT

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
«Duneland School Corporation - General»
«_»

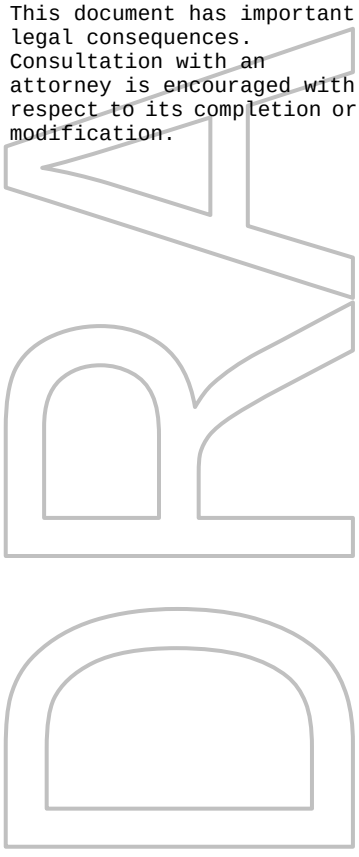
THE OWNER:
(Name, legal status and address)
«Duneland School Corporation»«_»
«601 West Morgan Ave.
Chesterton, Indiana 46304»

THE ARCHITECT:
(Name, legal status and address)
«Tria Architecture, Inc.»«_»
«901 McClintock Drive, Suite 100
Burr Ridge, Illinois 60527»

TABLE OF ARTICLES

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.

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



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INDEX
(Topics and numbers in bold are section headings.)

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,~~ consist of the Invitation to Bid, Instruction to Bidders, Bid Form, Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, ~~Specifications, Addenda~~ Schedules, 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)~~ 1) a written amendment ~~to~~ of the Contract signed by both parties, ~~(2) a Change Order, (3) a Construction Change Directive or (4)~~ 2) a Change Order, 3) a Construction Change Directive, 4) an Architect's Supplemental Instruction, or 5) 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.~~work issued by the Architect.

§ 1.1.2 THE OWNER

The term "Owner" shall refer to the Duneland School Corporation, which shall also be referred to as the "School Corporation."

1.1.3 THE CONTRACT

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

~~§ 1.1.3 THE WORK~~

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

§ 1.1.4 ~~THE PROJECT~~THE WORK

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

§ 1.1.5 ~~THE DRAWINGS~~THE PROJECT

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

§ 1.1.6 ~~THE SPECIFICATIONS~~THE DRAWINGS

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.~~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. Figured dimensions shall be followed in preference to measurements by scale. All shall be checked against field measurements of existing conditions to be taken by the Contractor.

§ 1.1.7 ~~INSTRUMENTS OF SERVICE~~THE SPECIFICATIONS

~~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.~~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.

§ 1.1.8 ~~INITIAL DECISION MAKER~~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.

§ 1.1.9 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.

1.1.10. MISCELLANEOUS DEFINITIONS

1.1.10.1 The term "Fabricated" as used throughout the Contract Documents is hereby defined to mean items specifically assembled or made of selected materials or components to meet individual design requirements.

1.1.10.2 The term "Furnish" as used throughout the Contract Documents is hereby defined to mean materials or items to be furnished.

1.1.10.3 The term "Install" as used throughout the Contract Documents is hereby defined to mean materials or items furnished by other trades shall be installed only. Such materials or items shall be received at the site, unloaded, stored, protected, and installed in place, including connections, auxiliary items, and other work required for a complete and functioning installation, unless any such work is specifically excluded.

1.1.10.4 The term "Provide" as used throughout the Contract Documents is hereby defined to mean "furnish and install."

1.1.10.5 The phrase "Shop Fabricated" or "Shop Made" as used throughout the Contract Documents is hereby defined as items made by a contractor or subcontractor in their own Shop.

1.1.10.6 The words "Contractor shall" are implied and shall be so understood wherever a direction or instruction is stated in the imperative sense.

§ 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.~~ all.

§ 1.2.1.1 Where conflicts exist within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes and ordinances, the more stringent, or higher quality or greater quantity requirements shall apply. Large-scale drawings take precedence over small-scale drawings, figured dimensions over scaled dimensions and noted materials over graphic representations.

§ 1.2.1.2 The specifications are of the abbreviated type and may include incomplete sentences. Omissions of phrases such as "The Contractor shall" or "conforming to the requirements of" is intentional; omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings. Words in singular shall include a plural whenever applicable, or the context so indicates.

§ 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.

§ 1.2.3.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities: 1) The Agreement, 2) Addenda, with those of later date having precedence over those of earlier date, 3) The General Conditions of the Contract for Construction, 4) Drawings and Specifications.

§ 1.2.3.2 In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation. Large scale drawings shall take precedence over small scale drawings; figured dimensions on the drawings over scaled dimensions and noted material over graphic representations.

§ 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. The descriptive headings of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any provisions following them.

§ 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's or Architect's consultants' reserved rights.

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

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

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

ARTICLE 2 OWNER

§ 2.1 GENERAL

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

~~§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such~~

~~information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

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

§ 2.2.2 ~~Except for permits~~ 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.~~Documents.

§ 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.

§ 2.3 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. This right shall be in addition to and not in restriction or derogation of the Owner's rights under Article 14 hereof

§ 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~~ seven-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,~~ may immediately 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~~ including, but not limited to, attorney's fees, compensation for the Architect's additional services and expenses 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. If~~ Change Order shall be deemed signed by the Contractor for the purposes stated in Section 7.2.1 even if the Contractor fails to physically sign such Change Order. If the payments then or thereafter due the Contractor are not sufficient to cover such ~~amounts, the Contractor shall pay the difference to the Owner.~~amount, at the Owner's option, the excess shall be deducted from any payment thereafter due or shall be paid by the Contractor immediately upon demand of the Owner.

§ 2.5 ADDITIONAL RIGHTS

The rights stated in Article 2 shall be in addition and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

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

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 3.2.1.1 It shall be the duty of the Contractor to verify all dimensions given on the Drawings, and to report any error or inconsistency to the Architect before commencing work.

§ 3.2.1.2 If the Contractor finds any details, construction procedures or materials shown on the Drawings or called for in the Specifications which he believes are not satisfactory for the use shown, he shall so notify the Architect at least 5 days before bids are due. Signing of the contract and starting work by the Contractor shall indicate his agreement with all details, construction procedures, and materials so shown and/or specified and shall indicate his willingness to construct the project in strict accordance with these Documents and to guarantee the complete project in full compliance with the warranty provisions of the Contract Documents. By executing this contract, the Contractor further acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, including those bearing upon transportation, disposal, handling and storage of materials availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions of the ground, the character, quality and quantity of surface and subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the Work, and all other matters which can in any way affect the Work or the cost thereof under the Contract. Any failure by the Contractor to acquaint himself with all the available information concerning these conditions will not relieve him from any obligations with respect to the Contract.

§ 3.2.1.3 If work is required in a manner to make it impossible to produce work of the quality required by the Contract, or should discrepancies appear among the Contract Documents, the Contractor shall request in writing an interpretation from the Architect before proceeding with the Work. If the Contractor fails to make such a request, the Architect shall determine the quality of the work required, consistent with the Contract Documents, or which of the conflicting requirements shall govern. The Contractor shall perform the work at no additional cost to the Owner in accordance with the Architect's determination.

§ 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~~ The Contractor shall promptly report to the Owner and the Architect any errors, omissions, or inconsistencies in the Contract ~~Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form~~

~~as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.~~ Documents. The Contractor shall not be liable to the Owner or Architect for damage resulting from errors, inconsistencies, or omissions in the Contract Documents unless the Contractor recognized or should have recognized such error, inconsistency, or omission, and failed to report it to the Architect, in which case the Contractor shall not be entitled to an increase in the Contract Sum or Contract Time and the Contractor shall bear all attributable costs for correction. The Contractor agrees to release and hold harmless the Owner for errors, inconsistencies or omissions in the Contract Document.

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

§ 3.2.2.1 The exactness of grades, elevations, dimensions, existing conditions, or locations given on any drawings issued by the Architect or the work installed by other contractors, is not guaranteed by the Architect or Owner.

§ 3.2.2.2 The Contractor shall, therefore, satisfy himself as to the accuracy of all grades, elevations, existing conditions, dimensions and locations. In all cases of interconnection of the Contractor's work with existing or other work, the Contractor shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, existing conditions, locations or dimensions shall be promptly rectified by him without extra cost to the Owner.

§ 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 obligations in Sections 3.2.2 and 3.2.3, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, ~~inconsistencies~~ inconsistencies, or omissions in the Contract ~~Documents,~~ Documents or 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.~~ unless the Contractor recognized or should have recognized the error, inconsistency, omission, or difference and failed to report it.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. ~~If the Contractor is then instructed 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.~~ The Contractor shall review any construction or installation procedure (including those recommended by any product manufacturer). The Contractor shall provide written notice to the Architect:

(a) If a specified product deviates from good construction practices.
(b) If following the Specifications will affect any warranties.
(c) Any objections which the Contractor may have to the Specifications.

The responsibilities imposed on the Contractor by this Section shall be in addition to, and not be limited by, any and all other provisions of these Contract Documents.

§ 3.3.2 The Contractor shall engage workmen who are skilled in performing the Work and all Work shall be performed with care and skill and in a good workmanlike manner under the full time supervision of the approved superintendent described in Section 3.9.3. The Contractor shall be liable for all property damage including repairs or replacements of the Work and economic losses which proximately result from the breach of this duty. The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, ~~Subcontractors~~ Subcontractors, and their agents and employees, and any other persons or entities performing portions of the Work for, or on behalf of, the ~~Contractor or any of its Subcontractors.~~Contractor, any of its Subcontractors, or claiming by, through or under the Contractor, and for any damages, losses, costs, and expenses resulting from such acts or omissions.

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

§ 3.3.4 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 Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required of or performed by persons other than the Contractor.

§ 3.3.5 The Contractor shall coordinate all portions of the work with separate Owner-employed contractors, if any.

§ 3.3.6 The Contractor shall assign a competent, technically-trained office project manager to this project who shall perform all office functions including checking, approving and coordinating shop drawings and approving purchasing and disbursement pay-out requests and correspondence, and responding to Owner inquiries.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for any and all 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 written consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.
By making requests for substitutions hereunder, the Contractor:

.1 represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;

.3 certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and

.4 will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 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. The Contractor shall be responsible for any damages to property or injuries to persons, or to any other harm, caused by the Contractor's employees.

§ 3.4.4 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in Section 7.5.

§ 3.5 WARRANTY

~~The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not~~

~~conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.~~

~~§ 3.6 TAXES~~

~~The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.~~

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new, unless otherwise required or permitted by the Contract Documents and that the Work will be free from faults and defects and in conformance with the Contract Documents. The warranty will not be affected by the specification of any product or procedure, unless the Contractor objects promptly to such product or procedure and advises the Architect of possible substitute products or procedures which will not affect the warranty. This warranty shall not be restricted by the limitations of any manufacturer's warranty. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the Owner's sole discretion. Inability or refusal of the Subcontractor or supplier responsible for the defective work to correct such work shall not excuse the Contractor from performing under the warranty. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 Unless an alternative guaranty is specified in a particular division of the Specifications that is longer in duration than one (1) year, the Work shall be guaranteed by the Contractor against defect in material and workmanship for a period of one (1) year from the date of final completion (date of issuance of final payment to the contractor).

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 ~~Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies.~~ The Contractor shall secure all permits, licenses and inspections necessary for proper execution and completion of the Work ~~that~~ which are customarily secured after execution of the Contract and ~~legally required at the time bids are received or negotiations concluded.~~ which are legally required when bids are received.

§ 3.7.1.1 All cash deposits, bonds, fees, inspections, licenses, or permit fees shall be paid for by the Contractor.

§ 3.7.1.2 Prior to submission of all applications for permits, licenses or inspections the Contractor shall submit a copy of the application or written notice to the Owner for approval.

§ 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 observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, and rules and regulations, the Contractor shall promptly notify the Architect and Owner in writing to be addressed by the Architect and Owner. If the Contractor performs Work knowing it to be contrary to any 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 damages, losses, costs and expenses attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are ~~disturbed and in no event later than 21 days after first observance of the conditions.~~ disturbed. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are

not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15. The site conditions contemplated by this Section include, but are not limited to, materials containing asbestos, polychlorinated biphenyl (PCB), or hazardous materials as defined in the Contract Documents.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a ~~competent~~ competent, English speaking 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. Important communications by the superintendent shall be confirmed in writing. Other communications by the superintendent shall be similarly confirmed on written request in each case. Failure of the superintendent to supervise the job properly shall be deemed as a default under the Contract documents as determined by the Owner with the advice of the Architect.

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

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's ~~consent, which shall not unreasonably be withheld or delayed.~~ and Architect's written consent.

§ 3.9.4 The Contractor's superintendent must be dedicated solely to this project and must be at the project site each day and at all times that Work is being performed at the site, whether the work is performed by the Contractor's own forces or by any subcontractors. The superintendent must be at the project site from the first day of on-site activities until a minimum of fourteen (14) days after the date of Substantial Completion. Failure by the Contractor to provide full-time on-site supervision shall constitute grounds for termination of the Contract by the Owner with seven days written notice.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

§ 3.10.2 The Contractor shall prepare ~~a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.~~ and keep current, for the Architect's record only, a schedule of submittals (the "Submittal Schedule") which is coordinated with the Contractor's Construction Schedule and allows the Architect reasonable time, as indicated in the Contract Documents, to review submittals. Neither the Contractor's preparation of the Submittal Schedule nor the Architect's receipt or review shall modify the Contractor's responsibility to make required submittals or to do so in a timely manner to provide for review in accordance with Section 4.2.7 as modified herein.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect. The Owner's or Architect's silence to a submitted schedule that exceeds time limits current under the Contract Documents shall not relieve the Contractor of its obligations to meet those limits, nor shall it make the Owner or Architect liable for any of the Contractor's damages incurred as a result of increased construction time or not meeting those time limits. Similarly, the Architect's or Owner's silence to a Contractor's schedule showing performance in advance of such time limits shall not create or infer any rights in favor of the Contractor for performance in advance of such time limits.

§ 3.10.4 At the time of each Application for Payment, the Contractor shall provide to the Owner and the Architect an update on the project schedule and a written status report, which includes a description of the progress of the Work and, of progress is behind schedule, the Contractor's plan to recover the original schedule. The report shall also include a summary of the Contractor's meetings with subcontractors.

§ 3.10.5 The Contractor shall hold meetings at least weekly (or at such intervals as are otherwise acceptable to the Owner and Architect at the site. The Contractor shall provide the subcontractors, Architect and the Owner with a schedule. The Contractor shall require subcontractors currently working at the site(s) to have a representative present for such meetings.

§ 3.10.6 Within twenty-one (21) days of the award of the Contract, the Contractor shall provide a written report to the Architect and the Owner that includes a list of the Contractor's suppliers, a list of materials and equipment to be purchased from suppliers and fabricators, the time required for fabrication, and the scheduled delivery dates for materials and equipment. Copies of the Contractor's purchase orders shall be delivered to the Architect and the Owner as soon as possible after receipt by the Contractor.

§ 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~~ These, along with all operating manuals for all equipment, shall be available to the Architect ~~and shall be~~ at all times and delivered to the Architect for submittal to the Owner ~~upon completion of the Work as a record of the Work as constructed.~~ after completion of the Work but before the final Application for Payment.

§ 3.11.1 The Contractor shall maintain at the site(s) one record copy for the Owner and Architect the plans and specifications of concealed work, particularly concealed piping and conduit. Any deviations from conditions shown on the Contract Drawings shall be shown and dimensioned on these field record drawings. Contractor shall develop layout drawings for concealed work that is schematically indicated on Contract Drawings in order to have dimensioned layouts of such concealed work. This requirement does not authorize any deviations without approval of the Architect.

§ 3.11.1.1 The field information to be so marked shall include at a minimum:

(1) Significant deviations of any nature made during construction;

(2) Location of underground mechanical and electrical services, utilities, and appurtenances, referenced to permanent surface improvements.

(3) Location of mechanical and electrical services, utilities, and appurtenances that are concealed in the building, referenced to accessible features of the building.

§ 3.11.2 The Contractor and their Subcontractors shall maintain at the site(s) an accurate record of deviations and changes from the Contract Documents which occur in the work; shall indicate all such deviations and changes on reproducible transparencies of the Contract Documents; and shall turn over to the Architect upon completion of the work all such documents and information, such as final shop drawings and sketches, marked prints and similar data indicating the as-built conditions. Plumbing, HVAC and Electrical Contractors shall record all changes or deviations in their work from what appears on the Contract Documents. The electronic AutoCAD base plan backgrounds shall be furnished by the Architect. The cost of recording and transferring the changes or deviations to the transparencies shall be included in the contract price for the respective work. The as-built transparencies shall be delivered by the Contractor to the Architect prior to the final acceptance of the Project and issuance of final payment.

§ 3.11.2.1 From the field record prints of the Contract Drawings, the Contractor shall furnish and prepare on compact disk in AutoCAD format, a complete set of field record drawings, completely dimensioned to show all changes made during the course of the Work. Mechanical and Electrical field record drawing shall locate by dimensions each run of concealed pipe and conduit. Upon completion of the Work, the Contractor and each Subcontractor shall deliver and submit to the Architect a full set of all field record drawings, relating to the Work, on compact disk in AutoCAD format and two sets of full size prints.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

§ 3.12.10 ~~The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, 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~~ When professional certification or performance criteria of materials, systems or equipment is required by the Contract Documents, the Contractor shall provide the person or party providing the certification with full information on the relevant performance requirements and on the conditions under which the materials, systems, or equipment will be expected to operate at the project site. The certification shall be based on performance under the operating conditions at the project site. 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.~~ on the accuracy and completeness of such certifications.

§ 3.13 USE OF SITE

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

§ 3.13.1 Only material and equipment which is to be used directly in the construction of this Project shall be brought to and stored on the job site by the Contractor. After equipment is no longer needed on this Project, it shall be promptly removed from the job site. Protection of all construction materials and equipment stored at the Job Site is the sole responsibility of the Contractor.

§ 3.13.2 The Contractor and its subcontractors, and their respective employees, agents, and consultants, shall not enter any part or portion of the building work sites when students are present without the Owner's written authorization.

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.14.3 Only tradespersons skilled and experienced in cutting and patching shall perform such 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. The Contractor shall remove and clean up hazardous materials in accordance with these General Conditions.

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

§ 3.15.3 All exterior and interior work shall be cleaned using specific materials as recommended for surfaces to be cleaned. Damage to any surfaces due to improper cleaning methods of materials shall be repaired to the satisfaction of the Architect and Owner, by the Contractor, at no cost to the Owner.

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by ~~law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against~~ law, Contractor waives any right of contribution against and shall defend, indemnify and hold harmless Owner, any Owner's Representative, the Architect and their agents, consultants and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from or in connection with the performance of the Work, provided that any 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~~ (these are collectively referred to as "claims") is caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts ~~they~~ any of them may be liable, regardless of whether or not ~~such claim, damage, loss or expense~~ it 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~~ otherwise reduce any other right or obligation of indemnity or contribution which would otherwise exist as to any party or person described in this ~~Section 3.18.~~Contract. The Contractor shall have exclusive responsibility to comply with the requirements of the Structural Work Act. The obligations of the Contractor under this Section 3.18.1 shall be construed to include, but not be limited to, injury or damage consequent upon failure to use or misuse by the Contractor, his agents, Sub-Contractors, and employees of any scaffold, hoist, crane, stay, ladder, support, or other mechanical contrivance erected or constructed by any person, or any or all other kinds of equipment, whether or not owned or furnished by the Owner under the requirements of the Illinois Structural Work Act. It is understood that this excludes use by Owner, Architect or his Agents or Employees.

§ 3.18.2 ~~In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.~~The Contractor shall, and hereby covenants and agrees to indemnify, defend, save and hold harmless the following indemnitees: The Owner, its Architects, Board Members, Officers, Agents, and Employees, individually and collectively, from all claims, demands, actions and the like, of every nature and description, made or instituted, by Third Parties, arising or alleged to arise out of the work under this contract, as a result of any act or omission of either the Contractor or any Subcontractor, or any of their employees or agents. Contractor and Subcontractor shall name the Owner, its Architects, Board Members, Officers, Agents and Employees, individually and collectively, as additional insured as primary coverage without limitation on their general liability policies. Contractor and Subcontractor/s shall furnish Owner with copies of such policies prior to beginning any work.

§ 3.18.3 "Claims, damages, loses and expenses" as these words are used in this Contract shall be construed to include, but not be limited to (1) injury or damage consequent upon the failure of or use or misuse by Contractor, its Subcontractors, agents, servants or employees, of any hoist, rigging, blocking, scaffolding, or any and all other kinds of items of equipment, whether or not the same be owned, furnished or loaned by Owner; (2) all attorneys' fees and costs incurred in defense of the claim or in bringing an action to enforce the provision of this Indemnity or any other indemnity contained in the Contract Documents; and (3) all costs, expenses, lost time, opportunity costs, etc. incurred by the party being indemnified or its employees, agents or consultants.

§ 3.18.4 In the event that any party is requested but refuses to honor the indemnity obligations hereunder, then the party indemnifying shall, in addition to all other obligations, pay the cost of bringing any such action, including attorneys' fees, time expended by the party being indemnified and their employees in the defense of any litigation covered by this indemnity provision at their usual rates plus cost of travel, long distance telephone calls and reproduction of documents to the party requesting indemnity.

§ 3.18.6 Contractor shall include in each and every contract with any and all subcontractors and/or material suppliers performing Work and require each and every subcontractor and/or material supplier performing Work to agree to be bound by all of the provisions 3.18.1 through 3.18.9 under the Contract Documents.

§ 3.18.7 Contractor's indemnity obligations hereunder shall, but not by way of limitation, specifically include all claims and judgments which may be made against the indemnitees under federal or state law or the law of the other governmental bodies having jurisdiction, and further, against claims and judgments arising from violation of public ordinances and requirements of governing authorities due to Contractor's or Contractor's employees method of execution of the Work.

§ 3.18.9 The Contractor shall indemnify and hold harmless the Owner in the event of labor or trade union conflicts or disputes between the Contractor and subcontractors and their respective employees. The Contractor shall endeavor to adjust and resolve such conflicts and disputes which affect the timely completion of the Work. Such conflicts or disputes shall not be a basis or excuse for the violation of the Contract Documents by the Contractor or its subcontractors, and shall not provide the Contractor with relief from meeting all time limits for Substantial Completion or Final Completion. Labor or trade union disputes that effect production or delivery of materials or equipment, or their installation, shall be at no cost to the Owner. The Contractor shall notify the Architect and the

Owner in writing as soon as possible as to any labor or trade disputes which may affect the Work and its timely completion. In such event, the Contractor shall provide a written proposal to the Architect and the Owner which includes any comparable substitution(s) necessary to complete the Work.

§ 3.18.10 None of the foregoing provisions shall deprive the Owner or the Architect of any action, right or remedy otherwise available to them or either of them at law.

§ 3.19 If the work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner, the Architect or the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade. In case the progress of the work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of the conflict involving any such agreement or regulation, the Architect may require that other material or equipment of equal kind and quality be provided at no additional cost to the Owner.

ARTICLE 4 ARCHITECT

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

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

§ 4.1.4 The Architect's and their consultants' services will terminate sixty (60) days after (1) the date of Substantial Completion of the Work or (2) the anticipated date of Substantial Completion identified in Specifications, whichever is earlier. Any work required of the Architect and their consultants after this date will be back-charged to the Contractor by the Owner.

§ 4.2 ADMINISTRATION OF THE CONTRACT

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

§ 4.2.2 The Architect will visit the site at intervals ~~appropriate to the stage of construction, or as otherwise agreed with the Owner,~~ as agreed to by Owner and Architect 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~~ Work to endeavor to determine that the Work, when completed, will be in accordance with the Contract ~~Documents.~~ Documents, and to endeavor to guard the Owner against defects and deficiencies in the Work. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract ~~Documents, except as provided in Section 3.3.1.~~Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the ~~portion of the~~ Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner. However, this Section shall not be deemed to prohibit direct communication between the Owner and the Architect.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts. The Contractor shall provide to the Architect (1) mechanics lien waivers, (2) certified payroll statements and documentation as per the Indiana Common Construction Wage Act and (3) sworn statements listing subcontractors and materialmen before issuing Payment Certificates, and if such sworn statement or waivers are not provided, the Architect's Certificates shall be conditioned upon and subject to the receipt of such waivers.

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

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions ~~or, unless otherwise specifically stated by the Architect,~~ or of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. The Contractor will give submittals to the Architect in a manner to allow for the Architect's reasonable prompt review and to allow for timely ordering of components of the Work to affect no delay in the Work.

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

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section ~~9.10.~~9.10; however, the issuance of such final Certificate of Payment shall not bind the owner to any payment unless it accepts such final Certificate for Payment. Owner's acceptance shall not be unreasonably withheld. Additionally, the Architect shall review all warranties and related documents and provide a recommendation to the Owner as to whether they comply with the Contract Documents.

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

§ 4.2.11 The Architect will initially interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If the Contractor submits such written request to the Architect, the Contractor will simultaneously provide a copy of such request to the Owner. The Architect will consult with the Owner regarding any request by the Contractor before responding to the Contractor.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good ~~faith.~~faith and in the absence of negligence.

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. The Architect will provide the Owner with a copy of any response provided pursuant to this Section.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

§ 5.2.1 ~~Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract,~~ Prior to executing the Contract, the Contractor shall furnish in writing to the Owner through the 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 Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. ~~Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.~~

§ 5.2.1.1 In addition to the information which may be required prior to the execution of the Contract, not later than twenty-one (21) days after Notice of Award of the Contract, the Contractor shall furnish to the Owner through the Architect the names of persons or entities proposed as manufacturers for each of the products identified in the General Requirements and, where applicable, the name of the installing Subcontractor.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made ~~reasonable and timely~~ objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection. All contracts between the Contractor and subcontractors shall be made in writing, shall be assignable to the Owner, and shall contain the following sentence, 'The Owner is an intended third party beneficiary of this subcontract.

§ 5.2.3 If the Owner or Architect has ~~reasonable~~ objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no ~~reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be~~

~~issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.~~objection No additional costs shall be allowed for a change required due to an objection by the Owner, Contractor, or Architect.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected ~~if the Owner or Architect makes reasonable objection to such substitution.~~without written approval of the Owner. The Contractor further acknowledges and agrees that after award of the Contract to the Contractor, any savings on changes to contracts with subcontractors or substitute subcontractors will be for the benefit of the Owner and will not be used for the benefit of the Contractor or to increase the Contractor's profit on the Project. The foregoing benefit to the Owner shall include any adjustment in the amount of the price of a contract to less than the quoted price of the subcontractor upon which the Contractor's fixed bid price or Contract Sum was based. Further, if a manufacturer or supplier of any machinery or equipment, including but not limited to heating and air conditioning units or systems, changes specifications or offers incentives, discounts or lower prices after award of the Contract to the Contractor, those savings will inure to the benefit of the Owner and not the Contractor, subcontractor, manufacturer or supplier.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate ~~agreement, written where legally required for validity,~~ written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.1 The Contractor shall be responsible for any and all Subcontractors working under him and shall carry insurance for all Subcontractors or ensure that they are carrying it for themselves so as to relieve the Owner, Architect and Architect's Consultants of any and all liability.

§ 5.3.2 The Owner and Architect assume no responsibility for overlapping or omission of parts of the Work by various Subcontractors in their Contracts with the Contractor.

§ 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 SEPARATE CONTRACTORS

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

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of ~~subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.~~subrogation, without altering the Owner's agreement with the Contractor.

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

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

~~§ 6.1.4 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 and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

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

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

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

§ 6.3 OWNER'S RIGHT TO CLEAN UP

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

§ 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.

§ 7.1.4 For any changes in the Work requested by the Contractor involving more than a three (3) calendar day extension of time, the Contractor shall submit critical path schedules showing the original schedule and impact of the proposed change justifying the requested extension of time. The Owner may at its option refuse the extension of time and have the Contractor perform the work within the original schedule provided all reasonable costs for completing the work including overtime and acceleration costs are included in the Change Order.

§ 7.1.5 If a proposal for additional work is requested by the Owner from the Contractor which involves additional time, at the Owner's option, the Owner may extend the completion date for that portion of the work included in the change, without extending the Contract Time for the remainder of the work.

§ 7.1.6 Changes which involve credits to the Contract Sum shall include overhead, profit, general conditions, and bond and insurance costs.

§ 7.1.7 For any adjustments to the Contract Sum based on other than the unit price method, overhead, profit, and general conditions combined shall be calculated at the following percentages of the cost attributable to the change in the work:

.1 For the Contractor for Work performed by the Contractor's own forces, ten percent of the cost.
.2 For the Contractor, for Work performed by the Contractor's Subcontractors five percent of the amount due the Subcontractor.
.3 For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, ten percent of the cost.
.4 For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors, five percent of the amount due the Sub-subcontractor.
.5 Costs to which overhead, profit, and general conditions is to be applied shall be determined in accordance with Sub-Sections 7.3.6.1 through 7.3.6.5.
.6 When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any;

§ 7.1.8 In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by:

.1 A complete itemization of costs including labor, material.
.2 Subcontractor's, Sub-subcontractor's and material suppliers for their portions of the work itemized to include labor, material.
.3 Labor costs shall be indicated hourly wage and fringe benefits. Labor hours shall be provided for each phase of the work.
.4 Material costs shall include unit costs and units required where applicable.

§ 7.1.9 The Contractor understands that change orders to the contract which increase or decrease the cost by $10,000 or more, or the time of completion by 30 days or more, will require written documentation by the Owner that the changes:

.1 were not reasonably foreseeable at the time the contract was signed;
.2 were not within the contemplation of the contract as signed; and
.3 are in the best interest of the district or region and authorized by law.

§ 7.1.10 The Contractor shall provide written notice to the Architect and the Owner if overtime labor rates are included in the computation of the cost of a proposed Change Order or Construction Change Directive.

§ 7.1.11 In the event that the Contractor and the Owner do not reach agreement on a Change Order or a Construction Change Directive, the Owner may, in its discretion, delete the labor, materials and equipment that are the subject of the Change Order or the Construction Change Directive from the Work to be performed under the Contract Documents. The Owner shall receive credit from the Contractor for the labor, materials, and equipment, including Contractor overhead and profit attributable to the deleted work. The Owner may complete the deleted work through another contractor or subcontractor.

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 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 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.~~Upon resolution of exact scope, Contract Sum change, and Contract Time change, a Change Order shall be prepared incorporating the Construction Change Directive.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect 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

Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 ~~Costs~~ Actual costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 ~~Costs~~ Actual costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental actual costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

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

.5 Additional actual costs of supervision and field office personnel directly attributable to the change. Cost of supervision, unless directly attributable to change, will not be allowable as an itemized cost for any additions (or credited for deletions) unless a change in the Contract Time is made.

Overtime when specifically authorized by the Owner shall be paid for by the Owner on the basis of a premium payment only, plus the cost of insurance and taxes based on the premium payment. Overhead and profit will not be paid by the Owner for overtime. Field tickets must be signed by the Owner or Architect for verification of overtime hours.

§ 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~~ computed in accordance with Section 7.3.7 as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net ~~increase,~~ increase or decrease, if any, with respect to that change. Also, if the amount of either the credit or the addition is in dispute, the amount of the other, non-disputed item may not be included in Applications for Payment. Overhead and profit will be included in credits to the same extent they are included in additions.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

§ 7.3.11 Change Orders that result in a net decrease in or credit to the Contract Sum must include a credit to the Owner for the Contractor's overhead and profit as described in Section 7.1.7.

§ 7.4 MINOR CHANGES IN THE WORK

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

§ 7.5 SUBSTITUTIONS

After the award of the Contract, a request by the Contractor for a substitution of materials or equipment in place of those specified in the Contract Documents will be considered only under one or more of the following conditions:

(a) Required for compliance with interpretation of code requirements or insurance regulations then existing.
(b) Unavailability of specified products, through no fault of the Contractor.
(c) Subsequent information discloses inability of specified products to perform properly or to fit in designated space.
(d) Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required.
(e) When it is clearly seen, in the judgment of the Architect and with the Owner's approval, that a substitution would be substantially to the Owner's best interests, in terms of cost, time, or other considerations.

Substitution requests shall be written, timely, and accompanied by adequate technical and cost data. Requests shall include a complete description of the proposed substitution, name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, and any other data or information necessary for a complete evaluation by the Architect.

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.~~working day, excluding weekends and legal holidays.

§ 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. The Contractor shall bear all additional costs incurred to meet the Contract Time, which may require working overtime without additional compensation.

§ 8.2.4 The Contractor shall reimburse the Owner for all fees or expenses, including without limitation, the Architect, engineers and legal expenses, for additional services necessitated by Contractor's failure to obtain Substantial Completion within the time established in the agreement and for more than two (2) inspections for Substantial Completion or final inspection.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner ~~pending mediation and arbitration; or by other causes that the Architect determines~~ or by other causes which the Architect and Owner determine, in their sole

discretion, may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect and Owner may determine.

§ 8.3.2 ~~Claims relating to time shall be made in accordance with applicable provisions of Article 15.~~ The Contractor shall not be entitled to recover from the Owner, and hereby waives all rights that it or its subcontractors or any other person may otherwise have to recovery, any costs, expenses and damages of any nature that it or its subcontractors or any other person may suffer by reason of delay in the performance of the Work or any portion thereof, the extension of Contract Time granted herein being the Contractor's sole and exclusive remedy.

§ 8.3.3 The Contractor shall not be entitled to any increase in the Contract Sum as a result of any delays in the progress of the Work. The Contractor's sole remedy for delay shall be an extension of time. This Section 8.3 does not preclude recovery of damages ~~for~~ or delay by ~~either party~~ the Owner under other provisions of the Contract Documents.

§ 8.3.4 Notwithstanding other provisions in this Contract, Contractor shall not be entitled to any recovery of damages arising out of any event or delay caused within Contractor's control and/or for "Acts of God", including without limitation adverse weather conditions (which shall include typical rain events that can be reasonably predicted through historical data) which prevents such early completion of the Work.

§ 8.3.5 Where a delay occurs that is beyond the Contractor's control and when the delay is not reasonably unacceptable, the Contractor has an affirmative duty to mitigate the effect of that delay on the progress of the Work. An extension of the Substantial Completion date will not be granted to the extent that the Contractor breaches said duty to mitigate.

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,~~ At the pre-construction meeting, the Contractor shall submit to the ~~Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and~~ Owner and the Architect a detailed schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ~~ten~~ twenty (20) days before the Owner's submission date for the School Board's review and approval of such payment at the next School Board meeting or, if the Owner's School Board approves otherwise, before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

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

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay. However, this Section will not apply to routine retainage the Contractor intends to withhold from the Subcontractor pursuant to the Subcontract.

§ 9.3.1.3 No interest will be paid upon retention.

§ 9.3.1.4 Contractor shall submit all payment requests to the Architect for all work completed during the previous time period. Requests submitted late will not be processed until the following month. Contractor shall include the Contractor's waiver of lien for the full amount and partial subcontractor waivers of lien in the amounts of the previous payment request.

§ 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. Contractor shall submit requisitions from suppliers and Subcontractors to substantiate the amounts requested on the Application for Payment for materials or equipment stored on or off site. The Owner shall have no responsibility or liability to the Contractor for the safekeeping of materials and equipment stored at the site or 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.

§ 9.3.4 The Contractor shall submit his application for payment as outlined in Section 9.3 on the first of the month, and the Owner will make payment accordingly promptly after receipt of the Architect's Certificate. Each partial payment request shall be made monthly and Contractor shall request payment of ninety percent (90%) of the portion of the Contract Sum properly allocable to labor, materials and equipment incorporated in the work less the aggregate of previous payments in each case. The Owner reserves the right to reduce retainage prior to substantial completion. Retainage shall not be reduced below 5% until all closeout documents as required in the Instruments of Service have been received and reviewed by the Architect.

§ 9.3.5 Before each certificate for payment is issued, the Contractor shall furnish to the Architect a complete statement of the amounts due to Subcontractors, parties supplying material, and for his own materials and labor, on AIA Document G702 and G702A "Application and Certificate for Payment."

§ 9.3.6 A Sworn "Contractor's Affidavit" shall be submitted with each payment request in sufficient form for the Owner to determine Contractor's right to payment. Each payment request shall include executed waivers of lien in conformity with information set forth on a properly completed Contractor's Affidavit. In the event that the Owner is satisfied with Contractor's payment procedures, the Owner may accept partial waivers of lien of Subcontractors and suppliers who were included in the immediate preceding payment. The Contractor shall submit waivers on a current basis, but the Owner may allow Subcontractors and suppliers to be not more than one payment late with their partial waivers.

§ 9.3.7 Upon giving ten (10) days notice in writing to the Contractor, the full contract retainage may be reinstated and the retention restored to the basis established in Section 9.3.4 if the manner of completion of the work and its progress do not remain satisfactory to the Owner, or if any surety of Contractor withholds its consent.

§ 9.3.8 All material necessary for the construction of this Project, delivered upon the premises, shall not be removed from the premises without written consent of the Architect.

§ 9.3.9 The Contractor's request for final payment shall include: (1) the Contractor's Final Lien Waiver in the full amount of the contract; and (2) final lien waivers in the full amount of their contracts from all subcontractors and suppliers for which final lien waivers have not previously been submitted.

§ 9.4 CERTIFICATES FOR PAYMENT

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

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (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 Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a separate contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

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

§ 9.5.4 The Owner shall not be required to make payment unless in its own independent judgment it accepts the Architect's Certificate.

§ 9.6 PROGRESS PAYMENTS

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

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. In the event that the Owner elects to utilize an escrow agent, the Owner and the escrow agent may elect to make payments due the Contractor to the Contractor and its subcontractors.

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

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

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

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

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

~~§ 9.7 FAILURE OF PAYMENT~~

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

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. With respect to Work enumerated on the list accompanying the Certificate of Substantial Completion, the guarantee or warranty period shall start at the time of subsequent acceptance of this Work in writing by Owner.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the

Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, 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. The payment shall be sufficient to increase the total payments to 95 percent of the contract sum, less such amounts as the Architect shall determine for incomplete work and unsettled claims.

~~§ 9.9 PARTIAL OCCUPANCY OR USE~~

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

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. ~~The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.~~

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment 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 Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.~~

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

~~.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;~~

~~.2 failure of the Work to comply with the requirements of the Contract Documents; or~~

~~.3 terms of special warranties required by the Contract Documents.~~

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

§ 9.11 LIQUIDATED DAMAGES

The Contractor is solely responsible for substantially completing the Work by the scheduled Substantial Completion Dates for each Phase of the Work. This responsibility includes all work including that of the Contractor's forces, subcontractors and suppliers. The Contractor acknowledges that the Owner will suffer significant financial loss, and there will be disruption to the Owner, if the Project is not complete on or before the Substantial Completion Date for the work set forth in the Contract Documents. The Contractor further acknowledges that the measure of such loss and the disruption to the Owner would not be susceptible to precise calculation. To protect the Owner against said loss and disruption to the School District Community, the Owner and the Contractor hereby agree that the Contractor and the Contractor's Surety, if any, shall be liable for and shall pay to the Owner, Liquidated Damages of Five Hundred Dollars ($500) for each calendar day of delay per each School Campus, per Phase in Substantial Completion. Substantial Completion for this project refers to all scheduled work being a minimum 99% complete.

§ 9.11.2 Payments of Liquidated Damages are in addition to other damages that may be incurred by the Owner and not a penalty. All such Liquidated Damages may be set-off against any monies that may be due the Contractor. The Owner's approval or making of progress payments or final payment, with or without knowledge that the Work was untimely, shall not constitute or be deemed a waiver of the Owner's rights or claims, or of the Owner's ability to receive Liquidated Damages under the Contract or common law.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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

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

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

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

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

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

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

§ 10.2.9 The Contractor, prior to commencing the work, shall submit to the Architect, in writing, a statement certifying that he is familiar with the Manual of Accident Prevention in Construction by the Associated General Contractors of America, current edition, and further that the Contractor will maintain at the project a copy of said publication and will strictly enforce the applicable requirements of same. Contractor will also state the name of the Contractor's Safety Engineer who will be responsible for enforcing all safety requirements.

§ 10.2.10 All Construction documents pertaining to this Work, and the joint and several phases of construction hereby contemplated, are to be governed, at all times, by applicable provisions of the Federal Law, including but not limited to the latest amendments of the following:

.1 Williams Steiger Occupational Safety & Health Act of 1970 Public Law 91 596;

.2 Part 1910 — Occupational Safety & Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

.3 Part 1518 — Safety & Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations.

§ 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 and Architect in writing.

§ 10.3.1.1 The Contractor shall not cause or permit any "Hazardous Materials" (as defined herein) to be brought upon, kept or used in or about the Projects site(s) except to the extent such Hazardous Materials: (1) are necessary for the prosecution of the Work; and (2) have been approved in writing by the Owner. Any Hazardous Materials allowed to be used on the Project site(s) shall be used, stored, and disposed of in writing as directed in writing by the Owner. Any Hazardous Materials allowed to be used in the Project site(s) shall be used, stored, and disposed of in compliance with all applicable laws relating to such Hazardous Materials. Any unused or surplus hazardous Materials, as well as, any other Hazardous Materials that have been placed, released, or discharged on the Project site(s) by the Contractor or any of its employees, agents, suppliers, or subcontractors, shall be removed from the Project site(s) at the earlier of (1) completion of the Work requiring the use of such Hazardous Materials; (2) the completion of the Work as a whole; or (3) within twenty-four (24) hours following the Owner's demand for such removal. Such removal shall be undertaken by the Contractor at its sole cost and expense and shall be performed in accordance with all applicable laws. The Contractor shall immediately notify the Owner of any release or discharge of any Hazardous Materials on the Project site(s). The Contractor shall provide the Owner with copies of all warning labels on products that the Contractor or any of its subcontractors will be using in connection with the Work, and the Contractor shall be responsible for making any and all disclosures required under applicable "Community Right to Know" or similar laws. The Contractor shall not clean or service any tools, equipment, vehicles, materials, or other items in such a manner as to cause a violation of any laws or regulations relating to Hazardous Materials. All residue and waste materials resulting from any such cleaning or servicing shall be collected and removed from the Project site(s) in accordance with all applicable laws an regulations. The Contractor shall immediately notify the Owner of any citations, orders, or warnings issued to or received by the Contractor, or of which the Contractor otherwise becomes aware, that relate to any Hazardous Materials on the Project site(s). Without limiting any other indemnification provisions pursuant to law or specified in this Agreement, the Contractor shall indemnify, defend (at the Contractor's sole cost, and with legal counsel approved by the Owner), and hold the Owner and Architect harmless from any and all claims, demands, losses, damages, disbursements, liabilities, obligations, fines, penalties, costs, and expenses for removing and remedying the effect of any Hazardous Materials on, under, from, or about the Project site(s), arising out of or relating to, directly or indirectly, the Contractor's or its subcontractor's failures to comply with any of the requirements herein. As used herein, the term "Hazardous Materials" means any hazardous or toxic substances, materials, and wastes listed in the United States Department of transportation Materials Table, or listed by the Environmental Protection Agency as hazardous substances, and all substances, materials, or wastes that are or become regulated under federal, state, or local law.

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

~~§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or~~

~~expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.~~

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the ~~site unless such materials or substances are required by the Contract Documents.~~ site. 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 forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be ~~performed;~~performed including private entities performing work at the site and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the project;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's ~~employees;~~employees or persons or entities excluded by statute from the requirements of Section 11.1.1.1 but required by the contract documents to provide the insurance required by that Section;

.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;~~vehicle and coverage should be written on a comprehensive automobile policy which will include coverage for owned, non-owned and hired motor vehicles;

.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.

.9 Liability insurance should be written on the comprehensive general liability basis, and shall include, but not be limited to the following sub-lines:

A. Premises and Operations including x, c, u coverages (explosion, collapse, underground).

B. Products and Completed Operations.

C. Independent Contractor's Protective.

D. Broad Form Comprehensive General Liability Endorsement:
1. Contractual Liability, including contractors' obligation under Section 3.18.
2. Personal Injury & Advertising Injury Liability
3. Premises Medical Payments
4. Fire Legal Liability - Real Property
5. Broad Form Property Damage Liability (including Completed Operations)
6. Incidental Medical Malpractice Liability
7. Additional Persons Insured, including employees for personal and advertising injury.
8. Extended Bodily Injury Liability

.10 If liability insurance is written under the new simplified form - Commercial General Liability, the above listed coverages should be included.

.11 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or retroactive date shall predate the contract; the termination date of the policy shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Section 9.10.2, and an extended period endorsement "Supplemental Tail," must be purchased.

.12 In any and all claims against the Owner or the Architect, or any of their agents or employees, by any employee or Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the insurance obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or subcontractor under the Worker's Compensation Act, disability benefit acts or other employees benefits acts.

.13 The General Liability coverages shall be provided by a commercial General Liability Policy on an occurrence basis.

§ 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~~ 60 days after the date of final completion or for such other period for maintenance of completed operations coverage as specified in the Contract Documents. 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.

§ 11.1.2.1 The insurance required by Section 11.1.1 shall be written for not less than the following limits, or greater if required by law:

1. Workers' Compensation, Occupational Disease and Employer's Liability Insurance:
   a. State: Statutory limits
   b. Applicable Federal (e.g., Longshoremen's): Statutory limits
   c. Employer's Liability
      $1,000,000 Per Accident
      $1,000,000 Disease, Policy Limit
      $1,000,000 Disease, Each Employee

2A. If written under Comprehensive General Liability Policy Form (including sub-lines specified in Section 11.1.1.9)
   a. Bodily Injury:
      $1,000,000 Each Occurrence
      $2,000,000 Aggregate
   b. Property Damage:
      $1,000,000 Each Occurrence
      $2,000,000 Aggregate
   c. Bodily Injury and Property Damage combined:
      $1,000,000 Each Occurrence
      $2,000,000 Aggregate
   d. Personal Injury:
      $1,000,000 Aggregate

e. Products and Completed Operations to be maintained for one year after final payment: $1,000,000 Aggregate
f. Property Damage Liability Insurance shall provide X, C and U coverages.
g. Broad Form Property Damage Coverage shall include Completed Operations.

2B. If written under Commercial General Liability Policy Form.
a. $2,000,000 General Aggregate
b. $1,000,000 Products Completed Operations Aggregate
c. $1,000,000 Personal and Advertising Injury
d. $1,000,000 Each Occurrence
e. $50,000 Fire Damage (any one fire)
f. $5,000 Medical Expense (any one person)

3. Contractual Liability:
a. Bodily Injury:
$1,000,000 each occurrence
$2,000,000 aggregate

b. Property Damage:
$1,000,000 each occurrence
$2,000,000 aggregate

4. Personal Injury, with Employment Exclusion deleted:
a. $1,000,000 aggregate

5. Business Automobile Liability (including owned, non-owned and hired vehicles):
a. Automobile Liability:
i. Bodily injury:
$1,000,000 each person
$1,000,000 each occurrence
ii. Property Damage:
$1,000,000 Each Occurrence
$1,000,000 Combined Single Limit

6. Umbrella Excess Liability:
$2,000,000 Over Primary Insurance
$10,000 Retention for Self-Insured Hazards
Each Occurrence

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner 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 on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. On the Certificate of Insurance, delete in the cancellation provision the following words, 'Endeavor to' and 'but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives.

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

§ 11.1.5 The insurance company issuing the comprehensive general liability insurance coverage required for the performance of this contract shall be licensed to do business in Illinois with Best's Insurance Guide (current edition) rating of "A" or better and satisfactory to the Owner.

§ 11.1.6 If the insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a Commercial General Liability policy form, ACCORD form 25S will be acceptable. These certificates shall specifically state that the Owner, his representatives, and the Architect are protected by the Contractor's insurance against all liabilities as spelled out in Par. 3.18 of AIA Doc. A201, as modified hereinabove.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.2.1. The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the contract and that will protect the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees and all other defense costs whether in legal or administrative actions.

§ 11.2.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the insurance obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the contractor or any subcontractor under Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.

§ 11.2.3 The Contractor shall give the Owner the original policy and shall furnish the Architect memorandum copies of said policy. The Owner and Architect shall be the named insureds in this Protective Liability Policy. The Contractor shall protect the Owner and the Architect and their agents and employees from expenses, including attorney's fees, arising out of or resulting from the performance sickness, disease, or death, or injury to, or destruction of any tangible property (other than the Work itself) including the loss of use therefrom that is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether it is caused in whole or in part by a party to whom insurance is afforded pursuant to this Section.

§ 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.~~The Builder's Risk Insurance is required and shall be purchased and maintained by the Owner until Substantial Completion.

§ 11.3.1.1 ~~Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.~~The policy shall be a Completed Value All Risk Builder's Risk policy and shall cover all work (including that of all contractors) in the course of construction excluding temporary structures and materials used in the construction process stored on or within one hundred feet of the construction site and while awaiting installation. The policy shall be written in an amount equal to 100% of the total sum of all contracts. However, the policy is based on a $5,000 deductible, applicable to all loses for each occurrence. Therefore,

the Contractor shall be solely responsible for any and all losses up to $5,000. Losses are adjustable with and payable to the Owner for his own account.

§ 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.~~Coverage shall include, but not be limited to:

A. All Risk of Direct Physical Loss, including Fire and Extended Coverage (Lightning, wind storm, hail, explosion, riot, civil commotion, aircraft, vehicle and smoke).
B. Vandalism and Malicious Mischief.

§ 11.3.1.3 ~~If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.~~Coverage shall not extend to:

A. The Contractors', Subcontractors', or the Architect's/Engineer's Tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring and other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work.
B. Property owned by employees of any of the foregoing.
C. Vehicles of any kind.
D. Trees and shrubs.
E. Drawings and specifications.

~~§ 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.~~The policy by its terms or endorsement shall specifically permit and allow for beneficial or partial occupancy prior to completion or acceptance of the project by the Owner.

§ 11.3.1.6 The prompt repair or reconstruction of the Work as a result of any insured loss or damage shall be the Contractor's responsibility and shall be accomplished at no additional cost to the Owner or Architect. The contractor shall furnish the proper assistance in the adjustment and settlement of any loss. Loss will be adjustable with and payable to the party purchasing the Builder's Risk Insurance who shall be responsible for apportioning the loss proceeds to each and every entity involved in the loss to the extent of his interest. The policy shall contain a provision that the policy will not be canceled, changed or altered until at least 30 calendar days prior written notice has been given to the named insured.

§ 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, 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, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, 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 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 they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.~~

§ 11.3.8 A loss insured under the 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.~~ reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have the 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, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.~~ insurers."

§ 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.~~ Contractor shall furnish a Performance Bond and

Labor and Material Payment Bond in the amount of one hundred percent (100%) of the Contract Sum. Owner requires that the bond surety must carry a BEST RATING of A and that the Owner has no objection to the bond surety.

§ 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.~~The Contractor shall deliver the required bonds to the Owner not later than ten days following the date of notification of the Award of Contract or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§ 11.4.3 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney. Such bonds shall be in the form of American Institute of Architect's Document A-311 or a similar form worded exactly the same as Doc. A-311 and shall bear the same date as, or a date subsequent to, the date of the Contract. The bonds shall be issued by a bonding company licensed to operate in the State of Indiana and approved by the Owner.

§ 11.4.4 The failure of the Contractor to supply the required bonds within 10 days after the prescribed Agreement forms are presented for signature, or if the bonding company finds that the Contractor is NOT bondable, shall constitute a default, and the Owner may award the Contract to the next responsible low bidder.

§ 11.4.5 If at any time the Owner becomes dissatisfied with any Surety or Sureties then upon the Bonds, or for any other reason such Bonds shall cease to be adequate security for the Owner, the Contractor shall, within five (5) days after notice to do so, substitute acceptable Bonds in such forms and sum and signed by such other Sureties as may be satisfactory to the Owner. No further payments shall be deemed due nor shall be made until the new Sureties shall have qualified.

§ 11.4.6 Whenever the Contractor shall be and is declared by the Owner to be in default under the Contract, the Surety and Contractor are each responsible to make full payment to the Owner for any and all additional services of the Architect as which are required as a result of the Contractor's default and in protecting the Owner's right under the Agreement with the Contractor.

§ 11.4.7 The Contractor must within ten (10) days after the execution of this Agreement furnish a Payment Bond agreeing to pay not less than the prevailing wage for work to be performed in accordance with the Contract and the laws of the State of Indiana, and agreeing to pay all sums of money due for labor, materials, apparatus, fixtures or machinery and transportation with respect thereto, as in said Payment Bond provided, each dated the same day as the Agreement, in the forms prescribed by the Owner and each in an amount equal to the Contract Sum with a corporate Surety or Sureties acceptable to the Owner authorized to do business in the State of Indiana. These Bonds shall be maintained by the Contractor and shall remain in full force and effect until final acceptance of the work by the Owner or sixty (60) days following the date of Final Payment, whichever occurs later. The Contractor shall agree and shall cause the Surety to agree to be bound by each and every provision of the Contract Documents.

§ 11.4.8 In the event the Surety will make any assignment for the benefit of creditors or commit any act of bankruptcy, or if it shall be declared bankrupt or if it shall file a voluntary petition in bankruptcy or shall in the opinion of the Owner be insolvent, the Contractor shall agree forthwith upon request of the Owner to furnish and maintain other corporate Surety with respect to such bonds satisfactory to the Owner.

§ 11.5 ADDITIONAL INSURANCE REQUIREMENTS

§ 11.5.1 The Contractor is responsible for determining that subcontractors are adequately insured against claims arising out of or relating to the Work. The premium cost and charges for such insurance shall be paid by each subcontractor.

§ 11.5.2 The limits of liability as stated may be arrived at using a Split-Limit or a Combined Single Limit basis. However, the total limit of liability shall not be less than that stated in the requirements.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

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

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 ~~AFTER SUBSTANTIAL COMPLETION~~AFTER FINAL 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~~ Final 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 at the Contractor's sole expense 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 for correction of Work shall be extended with respect to portions of Work first performed after ~~Substantial~~ Final Completion by the period of time between ~~Substantial~~ Final 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.~~In the case of any work performed in correcting defects pursuant to guarantees provided or referred to by this Article 12, the guarantee period shall begin anew from the date of the completion of such work.

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract ~~Documents.~~Documents and pay all attorney's fees and expenses related thereto, immediately upon demand.

§ 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.~~Laws of Indiana.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make 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, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.4.3 The Owner and the Architect reserve the right to accept or reject any substitutions bid upon. If substitutions are not specifically accepted in writing, materials specified as "standard" shall be used in construction of this project.

§ 13.4.4 Any material specified by reference to the number, symbol or title of specific standards, such as Commercial Standards, Federal Specifications, trade association standards, or similar standards, shall comply with requirements in the latest revision thereof and any amendment of supplement thereto in effect on the date of the Instruments of Service, except as limited to type, class or grade, or modified in such reference by a given date. The standards related to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications.

§ 13.5 TESTS AND INSPECTIONS

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

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

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense. Notwithstanding any other term or provision in this Article 13 to the contrary, in the event that any testing or inspection of the Work or any part thereof reveals defects in materials or workmanship, then the Contractor shall remedy such defects and shall bear all costs and expenses associated with such testing which is related to determining whether such defects have been properly remedied.

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

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

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

§ 13.6 INTEREST

~~Payments due 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.~~Any references in this agreement to interest being assessed against the Owner are hereby deleted.

~~§ 13.7 TIME LIMITS ON CLAIMS~~

~~The Owner and 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 Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.~~

§ 13.8 REGULATIONS

§ 13.8.1 The Contractor and/or Subcontractor warrant/s that s/he is familiar with and s/he shall comply with Federal, State and local laws, statutes, ordinances, rules and regulations, School Board Rules and Policies, and the orders and decrees of any courts or administrative bodies or tribunals in any manner affecting the performance of the contract including without limitation Workmen's Compensation Laws, minimum salary and wage statutes and regulations, laws with respect to permits and licenses and fees in connection therewith, laws regarding maximum working hours, and, without limitation, such other laws and regulations as are specifically described below. Additionally, Contractor and subcontractor warrant that s/he shall comply with any amendments to such Federal, State and local laws, statutes, ordinances, rules and regulations that are enacted thereafter during the performance of the Work and under this Contract. To the extent that there are any violations of any of the applicable laws, rules, regulations and/or court orders/decrees mentioned herein, Contractor and Subcontractor shall be responsible for indemnifying and holding both the Owner and Architect free and harmless from all costs, fees and expenses incurred, directly or indirectly and including without limitation attorneys' fees, by the Owner or the Architect in responding to and complying with demands made by any of the governmental departments/agencies and/or the courts, or an aggrieved employee or person and such amounts may be withheld from the payments to be made on the project. It is the intention that the Owner and Architect shall suffer no time loss or other additional expenses in complying with any inquiry made with regard to any compliance with the applicable laws, rules and regulations referenced herein. No plea of misunderstanding or ignorance thereof will be considered.

§ 13.8.1.1 Whenever required or upon the request of the Architect or Owner, the Contractor or subcontractor shall furnish the Architect and the Owner with satisfactory proof of compliance with said Federal, State and local laws, statutes, ordinances, rules, regulations, orders, and decrees.

§ 13.8.2 The Contractor and Subcontractors shall carefully examine the Occupational Safety and Health Act of 1970, published in May 1971, as issued by the Federal Register (OSHA), and the specific regulations governing procedures, techniques, safety precautions, equipment design, and the configuration of the same as required under this Act and the Contractor agrees as evidenced by his submission of a bid to comply with all terms of the Act and to perform and complete in a workmanlike manner all work required in full compliance with said Act. The Contractor is responsible to comply with OSHA and its regulations as amended in performing any work under the Contract Documents.

§ 13.8.3 The Contractor shall comply with all federal, state and local non-discrimination laws:

§ 13.8.3.2.1 Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, creed, sex, marital status, national origin or ancestry, age, citizenship, physical or mental handicap or disability, military status, unfavorable discharge from military service or arrest record status: and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.

§ 13.8.3.2.2 Contractor, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service.

§ 13.8.15 No Smoking. In accordance with the Owner's Policy, smoking is prohibited on all School Corporation property.

§ 13.8.16 Concurrent with the execution of this Contract, the Contractor has executed the Certificate of Eligibility.

§ 13.8.17 The Contractor understands and acknowledges that its work, in whole or in part, will be performed on public school property where there may be direct, daily contact with school students. The Contractor further understands and acknowledges that the State of Indiana requires that all employees of vendors, licensees, contractors or others having direct, daily contact with students are subject to a criminal background check and may not be listed on the State Sex Offender Registry. Prior to allowing any of its employees who will be performing the scope of work access to school property, the Contractor agrees to provide the Owner, at the sole cost of the Contractor with the following:

(1) Evidence that each employee, agent, contractor or other person performing work on school property under this Agreement was subjected to a criminal background check in conformity with I.C. 20-26-5-10; that said persons are not listed on said Registry; and said persons have no criminal convictions for the offenses listed under I.C. 20-26-5-11(6);

(2) The Contractor will provide the Owner, upon request, a copy of the criminal background check conducted on each such person.

In the event the Contractor plans to subcontract with or use the services of another person or firm that may have direct, daily contact with students on school property, in order to fulfill its obligations under its Agreement with the Owner then in that event the Contractor will require all such persons or firms to comply with the provisions of this paragraph and I.C. 20-26-5-10.

In the event the Contractor fails to comply with the provisions of this paragraph and I.C. 20-26-5-10, and as a result a suit or claim is instituted by a student for harm caused by an employee of the Contractor, or caused by an employee of a subcontractor to the Contractor, then in that event the Contractor agrees to fully defend and indemnify, including reimbursement of attorney's fees and costs, the Owner against any such claims.

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 Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or~~

~~.4 The Owner has failed to furnish to the Contractor 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 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 and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.~~

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

~~§ 14.2.1 The Owner may terminate the Contract if the Contractor~~

~~.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;~~

~~.2 fails to make payment to Subcontractors 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.~~

§ 14.2.1 If the Contractor shall institute proceedings or consent to proceedings requesting relief or arrangement under the Federal Bankruptcy Act or any similar or applicable federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor and such petition is not dismissed within sixty (60) days after the date of said filing, or if the Contractor admits in writing his inability to pay his debts generally as they become due, or if he makes a general assignment for the benefit of his creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of his bankruptcy or insolvency; or if a receiver of all or any substantial portion of the Contractor's properties is appointed; or if the Contractor abandons the Work; or if he fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work; or if he submits an Application for Payment, sworn statement, waiver of lien, affidavit or document of any nature whatsoever which is intentionally falsified; or if he fails to make prompt payment to Subcontractors or for materials or labor or otherwise breaches his obligations under any subcontract with a Subcontractor; or if a mechanic's or material man's lien or notice of lien is filed against any part of the Work or the site of the Project and not promptly bonded or insured over by the Contractor in a manner satisfactory to the Owner; or if the Contractor disregards any laws, statutes, ordinances, rules, regulations or orders of any governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project; or if he otherwise violates any provision of the Contract Documents; then the Owner, without prejudice to any right or remedy available to the Owner under the Contract Documents or at law or in equity, the Owner may, after giving the Contractor and the surety

under the Performance Bond and under the Labor and Material Payment Bond described in Section 11.5, seven (7) days' written notice, terminate the employment of the Contractor. If requested by the Owner, the Contractor shall remove any part or all of his equipment, machinery and supplies from the site of the Project within seven (7) days after the date of such request, and in the event of the Contractor's failure to do so, the Owner shall have the right to remove or store such equipment, machinery and supplies at the Contractor's expense. In case of such termination, the Contractor shall not be entitled to receive any further payment for Work performed by the Contractor through the date of termination. The Owner's right to terminate the Owner-Contractor Agreement pursuant to this Section 14.2.1 shall be in addition to and not in limitation of any rights or remedies existing hereunder or pursuant hereto or at law or in equity.

§ 14.2.2 When any of the above reasons exist, the Owner, 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 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~~ all costs to the Owner of completing the Work, then the Contractor shall be paid for all Work performed by the Contractor to the date of termination. If such costs to the Owner of completing the Work exceed such unpaid balance, the Contractor shall pay the difference to the ~~Owner. The amount~~ Owner immediately upon the Owner's demand. The costs to the Owner of completing the work shall include (but not be limited to) the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another contractor or other subcontractors, any additional interest or fees which the Owner must pay by reason of a delay in completion of the Work, attorneys' fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. The amount, if any, to be paid to the Contractor ~~or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application,~~ shall be certified by the Architect, upon application, in the manner provided in Section 9.4, and this obligation for payment shall survive ~~termination of the Contract.~~the termination of the Contract.

§ 14.2.5 The Owner may, upon seven (7) days written notice to the Contractor, terminate the Agreement between the Owner and Contractor without cause. Upon written request and submittal of the appropriate documentation as required by the Owner, the Owner shall pay the Contractor for all work performed by the Contractor to the date of termination that has been approved by the Owner. The Owner may, upon the Contractor executing such a confirmatory assignments as the Owner shall request, accept and assume all of the Contractor's obligations under all subcontracts executed in accordance with the terms of the Contract Documents that may accrue after the date of such termination and that the Contractor has incurred in good faith in connection with the Work. Upon receipt of notice of termination, the Contractor shall cease all operations on the date specified by the Owner, terminate subcontracts not assumed by the Owner, make no further orders of materials or equipment, complete work not terminated (if any), and provide such reports as may be requested by the Owner and the Architect as to the status of the Work and the Work remaining to be completed. The Owner's right to terminate the Contract under this Section shall be in addition to, and not in limitation of, its rights to stop the Work without terminating the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption 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 the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of 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 to the Contract 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.

§ 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 Architect, if the 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 Architect will prepare Change Orders and issue Certificates 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 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a ~~Claim~~ claim for an increase in the Contract Time, written notice as provided herein shall be ~~given. The Contractor's Claim~~ given within seven (7) calendar days after the event giving rise to the claim. The Contractor's claim shall include an estimate of cost and of probable effect of the delay on the progress of the Work. In the case of a continuing ~~delay, only one Claim~~ 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~~ waives Claims against the Owner and Architect 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 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, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the ~~parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.~~parties, subject to litigation.

~~§ 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 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.~~

ARTICLE 16 LIMIT TO AVOID INCORPORATION OF RESPONSIBILITY BY REFERENCE

§ 16.1 Where any specification which is incorporated herein by reference, through the words "and/or as directed by the Architect," or phrases having a similar effect appear to give the Architect the right to direct something other than that specified, the Architect has in fact no such right to except as it may be established in specific instances in portions of this Instruments of Service other than in said specifications.

ARTICLE 17 INCORPORATION OF CONTRACT TERMS WITH SUBCONTRACTORS

§ 17.1 Contractor agrees that s/he will be responsible to incorporate all of the terms and conditions herein, including all amendments to this Contract, with any and all of the Subcontractors as well as any Subcontractors retained by Subcontractors. Contractor acknowledges that it is the Owner's intent that all of the terms and conditions herein, including all amendments to this Contract, will be adhered to by the Contractor and all Subcontractors performing any Work in this project.

~~§ 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.~~

SECTION 00820

RESPONSIBLE BIDDER FORM

Duneland School Corporation

Responsible Bidding Practices Submission Form

**Refer to the Duneland School Corporation "Policy to establish Responsible Bidding Practices"*

Project: Duneland School Corporation – 2017 Mechanical Renovations at Jackson Elementary School .

Bid Opening Date: March 23, 2017.

Name of Contractor:

_____

Address:

_____

Telephone:

_____

Name of Primary Contact:

_____

Category of Work:

_____

Contractors proposing to submit bids on any Duneland School Corporation ("School") project estimated to be at least one hundred fifty thousand dollars ($150,000) or more must, prior to the opening of bids, submit a statement made under oath and subject to perjury laws, the following:

1. Attach to this Form a Certificate of Good Standing from the Indiana Secretary of State dated within the last 60 days. (This requirement shall not apply if the bidder is an individual, sole proprietor or partnership.)

2. List all names previously used by the bidder within the last five (5) years:
   _____
   _____
   _____
   _____

3. Within the last five (5) years, has the bidder been determined by a court or governmental agency to be in violation of any federal, state, or local laws, including violations of contracting or anti-trust laws, tax or licensing laws, the Occupational Safety and Health Act (OSHA) violations, federal Davis-Bacon Act violations or violations of the Indiana Common Construction Wage Act? If so, identify the date of the violation and identify the court or agency issuing the determination.
   _____
   _____
   _____
   _____

4. State whether the bidder intends to employ its own employees or whether the bidder intends to utilize subcontractors to be utilized by the bidder for the project. If the bidder intends to use subcontractors for the project, identify all subcontractors the bidder intends to utilize.

   _____
   _____
   _____
   _____

5. Provide evidence of the bidder's participation in apprenticeship and training programs applicable to the work to be performed on the project which are approved by and registered with the United States Department of Labor's Office of Apprenticeship or any similar organization. Include copies of all applicable certificates or standards for such training programs.

6. Provide a copy of the bidder's workplace drug-testing policy that covers all employees of the bidder and meets or exceeds the requirements of Indiana Code 4-13-18.

7. Identify, by name and description of experience, each of the bidder's project managers and superintendents that bidder intends to assign to work on the project.

   _____
   _____
   _____
   _____

8. If applicable, identify all professional or trade licenses required by law to be held, for any trade or specialty area for which the bidder seeks a contract award.

   _____
   _____
   _____
   _____

9. If applicable, state whether any professional or trade license held by the bidder, or any directors, officer, or manager employed by the bidder, has been suspended or revoked within the last five (5) years.

   _____
   _____
   _____
   _____

10. Provide evidence that the surety company utilized by the bidder is on the United States Department of Treasury's Listing of Approved Securities.

11. Identify any federal, state, or local tax liens or delinquencies owed by the bidder to any federal, state, or local taxing body within the last five (5) years.

    _____
    _____
    _____
    _____

SECTION 00820

RESPONSIBLE BIDDER FORM

VERIFICATION

I swear or affirm, under the penalties for perjury, that the foregoing information is true and that I am duly authorized by the bidder to make the representations herein. I understand and acknowledge that any material changes to the bidder's status or as to any of the information provided on this Form must be reported to the School Corporation within ten (10) days from the date of the occurrence or the change of status and that the School Corporation reserves the right to request additional information and verification of any of the information submitted pursuant to this Form.

Bidder: _____

By: _____

Its: _____

Date: _____

A Policy to Establish Responsible Bidding Practices and Submission Requirements for Submitting Bids to Perform Construction Work

WHEREAS, the Duneland School Corporation is required by law to award capital improvement contracts to the "lowest responsive and responsible" bidder; and,

WHEREAS, the Duneland School Corporation, based upon its experience, has determined that quality workmanship, efficient operation, safety, and timely completion of projects requires all bidders meet certain minimum requirements in order to be a "responsive and responsible" bidder; and,

WHEREAS, applicable state law also requires that bidders meet certain minimum requirements in order to be a "responsive and responsible" bidder; and,

WHEREAS, the Duneland School Corporation seeks to enhance its ability to identify "responsive and responsible" bidders on all School construction projects by institution of more comprehensive submission requirements which are in compliance with Indiana State law; and,

WHEREAS, the "Responsible Bidding Practices and Submission Requirements" policy will preserve administrative resources by insuring that only qualified contractors and subcontractors are awarded contracts on public works construction projects; and,

WHEREAS, the "Responsible Bidding Practices and Submission Requirements" policy will assure efficient use of taxpayer dollars, will promote public safety and is in the public interest.

THEREFORE, this Policy, which is entitled "Responsible Bidding Practices and Submission Requirements for Submitting Bids to Perform Construction Work," is hereby adopted and reads as follows:

I. Bid Submission Requirements

Contractors proposing to submit bids on any Duneland School Corporation ("School") project estimated to be at least one-hundred fifty thousand dollars ($150,000.00) or more must, prior to the opening of bids, submit a statement made under oath and subject to perjury laws, on a form designated by the School and must include:

(A) A copy of a print-out of the Indiana Secretary of State's on-line records for the bidder dated within sixty (60) days of the submission of said document showing that the bidder is in existence, current with the Indiana Secretary of State's Business Entity Reports, and eligible for a certificate of good standing. If the bidder is an individual, sole proprietor or partnership, this subsection shall not apply;

(B) A list identifying all previous names used by the bidder;

(C) A list of all determinations by a court or governmental agency for violations of federal, state, or local laws including, but not limited to violations of contracting or antitrust laws, tax or licensing laws, environmental laws, the Occupational Safety and Health Act (OSHA), or federal Davis-Bacon and related Acts;

(D) A statement on staffing capabilities, including labor sources;

(E) Evidence of participation in apprenticeship and training programs, applicable to the work to be performed on the project, which are approved by and registered with the United States Department of Labor's Office of Apprenticeship, or its successor organization. The required evidence includes a copy of all applicable apprenticeship certificates or standards for these training programs;

(F) A copy of a written plan for employee drug testing that: (i) covers all employees of the bidder who will perform work on the public work project; and (ii) meets, or exceeds, the requirements set forth in IC 4-13-18-5 or IC 4-13-18-6;

(G) The name and description of the management experience of each of the bidder's project managers and superintendents that bidder intends to assign to work on the project;

(H) Proof of any professional or trade license required by law for any trade or specialty area in which bidder is seeking a contract award; and disclosure of any suspension or revocation within the previous five years of any professional or trade license held by the company, or of any director, office or manager employed by the bidder;

(I) Evidence that the contractor is utilizing a surety company which is on the United States Department of Treasury's Listing of Approved Sureties; and

(J) A written statement of any federal, state or local tax liens or tax delinquencies owed by the bidder to any federal, state or local taxing body in the last five years.

The School reserves the right to demand supplemental information from the bidder, (additional) verification of any of the information provided by the bidder, and may also conduct random inquiries of the bidder's current and prior customers.

II. Post-Bid Submissions from Subcontractors

All bidders shall provide a written list that discloses the name, address, and type of work for each first-tier subcontractor from whom the bidder has accepted a bid and/or intends to directly contract with or hire on any part of the public work project, including individuals performing work as independent contractors, within five (5) business days after the date the bids are due.

In addition, each such subcontractor contracting directly with the bidder shall be required to adhere to the requirements of Section I of this Ordinance as though it were bidding directly to the School, except that such subcontractors shall submit the required information (including the name, address, and type of work for each of their subcontractors) to the successful bidder no later than five (5) business days after the subcontractor's first day of work on the public work project and the bidder shall then forward said information to the School. Payment shall be withheld from any subcontractor contracting directly with the bidder who fails to timely submit said information until such information is submitted and approved by the School.

Upon request, the School may require any subcontractors to provide the required information (including name, address, type of work on the project and the name of the subcontractor with whom the subcontractor has a direct contract). Payments shall be withheld from any

subcontractor who fails to timely submit this information until this information is submitted and approved by the School. Additionally, the School may require the successful bidder and relevant subcontractor to remove the nonresponsive or non-responsible subcontractor from the project and replace it with a responsive and responsible subcontractor.

Failure of a subcontractor to submit the required information shall not disqualify the successful bidder from performing work on the project and shall not constitute a contractual default and/or breach by the successful bidder. However, the School may withhold all payments otherwise due for work performed by a subcontractor, until the subcontractor submits the required information and the School approves such information. The School may also require that successful bidder to remove the subcontractor from the project and replace it with a responsive and responsible subcontractor.

The disclosure of a subcontractor ("Disclosed Subcontractor") by a bidder or a subcontractor shall not create any rights in the Disclosed Subcontractor. Thus, a bidder and/or subcontractor may substitute another subcontractor ("Substitute Subcontractor") for a Disclosed Subcontractor by giving the School written notice of the name, address, and type of work of the Substitute Subcontractor. The Substitute Subcontractor is subject to all of the obligations of a subcontractor under this Ordinance.

III. Validity of Pre-Qualification Classification

Upon designation by the School that a contractor's or subcontractor's submission in anticipation of a bid is complete and timely, and upon any further consideration deemed necessary by the School, the contractor or subcontractor may be pre-qualified for future School public works projects. A contractor's classification as "qualified" shall exempt the contractor or sub-contractor from the comprehensive submission requirements contained herein for a period of twelve (12) months. Thereafter, contractors or subcontractors who are pre-qualified must submit a complete application for continuation of "pre-qualified" standing, on a form provided by the School, (also referred to as the "short form") by December 31st for the upcoming calendar year. Failure by any pre-qualified contractor or subcontractor to timely submit its complete application for continuation of "pre-qualified" standing shall result in automatic removal of the designation, effective January 1 of the upcoming year. However, the "removed" contractor or subcontractor shall still be permitted to bid on School public works projects.

Any material changes to the contractor's status, at any time, must be reported in writing within ten (10) days of its occurrence to the School. The pre-qualification designation is solely within the discretion of the School and the School specifically reserves the right to change or revoke the designation for a stated written reason(s).

Denial of pre-qualification shall be in writing and shall be forwarded to the contractor within seven (7) working days of such decision. Any contractor denied or losing pre-qualification status may request reconsideration of the decision by submitting such request in writing to the School within five (5) business days of receipt of notice of denial.

IV. Incomplete Submissions by Bidders

It is the sole responsibility of the potential bidder to comply with all submission requirements applicable to the bidder in section I above by no later than the public bid opening. Post-bid

submissions must be submitted in accordance with section II above. Submissions deemed inadequate, incomplete, or untimely by the School may result in the automatic disqualification of the bid.

V. Responsive and Responsible Bidder Determination

The School, after review of complete and timely submissions, shall, in its sole discretion, after taking into account all information in the submission requirements, determine whether a bidder is responsive and responsible. The School specifically reserves the right to utilize all information provided in the contractor or subcontractor's submission or any information obtained by the School through its own independent verification of the information provided by the contractor.

VI. Certified Payroll

For projects in which the cost is at least $150,000, the successful bidder and all subcontractors working on a public work project shall submit a certified payroll report utilizing the federal form now known as a WH-347 which must be prepared on a weekly basis and submitted to the School within ten (10) calendar days after the end of each week in which the bidder or subcontractor performed its work on the public work project. These certified payroll reports shall identify the job title and craft of each employee on the project, e.g. journeyman electrician or apprentice electrician.

The School may withhold payment due for work performed by a bidder if the bidder fails to timely submit its certified payroll reports until such time as such certified payroll reports are submitted. The School may also withhold payment due for work performed by a subcontractor if the subcontractor fails to timely submit its certified payroll reports until such time as such certified payroll reports are submitted. The School shall not withhold payment to a bidder for work performed by the bidder or for work performed by subcontractors who have submitted their certified payroll reports, because one or more other subcontractors failed to timely submit their certified payroll reports.

VII. Public Records

All information submitted by a bidder or a subcontractor pursuant to this Policy, including certified payrolls, are public records subject to review pursuant to the Indiana Access to Public Records law (IC 5-14-3).

VIII. Penalties for False, Deceptive, or Fraudulent Statements/Information

Any bidder that willfully makes, or willfully causes to be made, a false, deceptive or fraudulent statement, or willfully submits false, deceptive or fraudulent information in connection with any submission made to the School shall be disqualified from bidding on all School projects for a period of three years.

IX. Conflicting Policies

Any Policy or provision of any Policy in conflict with the provisions of this Policy is hereby repealed.

X. Severability

If any provision of this Policy is found to be invalid, the remaining provisions of this Policy shall not be affected by such a determination. These other provisions of this Policy shall remain in full force and effect without the invalid provision.

This Policy, which is entitled "Responsible Bidding Practices and Submission Requirements for Submitting Bids to Perform Construction Work," is hereby adopted by the Duneland School Corporation on the 12th day of January 2016.

Ralph D. Ayres

Kristin Kroeger

Ron Stone

John R. Marshall

Mike Trout

SECTION 01100

SUMMARY

PART 1 – GENERAL

1.1 PROJECT

A. Project Name: 2017 Mechanical Renovations at Jackson Elementary School.
B. Owner's Name: Duneland School Corporation.
C. The Project includes, but is not limited to: removal and reinstallation of the existing ceiling systems as required for the work and mechanical renovation work. Removal and replacement of existing ceiling systems and light fixtures are considered under bid alternate work. Refer to Section 01230 for further information.

1.2 CONTRACT DESCRIPTION

A. Work covered by Contract Documents: As defined in the Contract Documents.
B. Definitions. The following terms are used throughout the Contract Documents. The work will be governed in accord with the definitions.
    1. Fabricated: Fabricated pertains to items specifically assembled or made of selected materials or components to meet individual design requirements.
    2. Manufactured: Manufactured means standard units, usually mass produced by an established manufacturer of the respective item.
    3. Provide: Provide means furnish and install.
    4. Shop fabricated or shop made: Shop fabricated or shop made refers to items made by a Contractor or Subcontractor in their own Shop.
C. Insurance
    1. Designated Purchaser:
        a. Owner shall purchase and maintain Builder's Risk Insurance in accord with the General Conditions.
        b. The Owner's insurance will be subject to a deductible of $5,000.00 per occurrence.
D. Contracts
    1. The Owner will award a single construction contract for all work specified in the Contract Documents.
    2. Upon award of the construction contract, the owner will issue a Letter of Intent to award a Construction Contract to the approved contractor. This Letter of Intent shall serve as a notice to proceed with the project according to the terms and conditions set forth in the Contract Documents, until the work under Contract Documents is completed. . The contractor shall commence all construction services as specified in the contract documents upon receipt of the Letter of Intent.

1.3 DUTIES OF CONTRACTOR

A. The contractor shall be responsible for providing and paying for:
    1. Labor, materials and equipment.
    2. Tools, construction equipment and machinery.
    3. Temporary water, heat and other utilities required for construction.
    4. Other facilities and services necessary for proper execution and completion of work.
B. The Architect will submit for the State of Indiana Design Release (ACDR) permit, and the Owner will pay the permit costs.
C. The contractor shall be responsible for, and submit, for the local municipality main building permit, and the Owner will pay the permit costs.
D. The contractor shall be responsible for paying and securing all other permits, governmental fees and licenses necessary for the proper execution and completion of the Project.
E. The contractor shall comply with all codes, ordinances, rules, regulations, orders and other legal requirements of the public authorities which govern the performance of the work under the Contract Documents.
F. The contractor shall coordinate, and have completed, all inspections required by public authorities relating to the performance of the work under the Contract Documents.
G. The contactor shall have duty to promptly submit written notice to the Architect of any known or observed variances of the Contract Documents from legal requirements that may govern the

work. Upon notice to the Architect, appropriate modifications will be made to the Contract Documents to account for the legal requirements. In the event the contractor fails to provide notice of any variances, he shall assume responsibility for any work known to be contrary to those legal requirements.

1. The contractor shall enforce strict discipline and maintain good order among employees and subcontractors. Contractor shall not employ unfit person of those not skilled in the assigned task

H. The contractor acknowledges that the Project is exempt from all State and Local use taxes. It shall be the duty of the contractor to: 1) obtain a sales tax exemption certificate number from the Owner; 2) place exemption certificate number on invoices for materials incorporated in work; 3) furnish copies of invoices to Owner upon request 4) file a notarized statement that all purchases made under exemption certificate were entitled to be exempt with Owner upon completion of work; and 5) pay any penalties assessed for the improper use of exemption certificate number.

1.4 OWNER OCCUPANCY

A. The date of Substantial Completion shall be no later than August 9, 2017, 5:00 p.m. Note: Substantial Completion for this project refers to all scheduled work being a minimum 99% complete.

B. The date of Final Completion shall be no later than September 29, 2017, 5:00 p.m. Note: Final Completion for this project refers to all scheduled work, punch list and closeout items being 100% complete.

C. The Architect's and their consultants' services will terminate sixty (60) days after (1) the date of Substantial Completion of the Work or (2) the anticipated date of Substantial Completion identified in Specifications, whichever is earlier. Any work required of the Architect and their consultants after this date will be back-charged to the contractor by the Owner.

D. Refer to General Conditions for Liquidated Damages.

1.5 JOB OPERATIONS

A. Project Security:
   1. The contractor shall provide necessary precautions such as fences or barriers to protect Owner's personnel or members of the general public in the areas in which construction activity is on-going.
   2. The contractor shall securely close-off all areas of construction after working hours to prevent entry by unauthorized persons.

B. Project Hours:
   1. Beginning on May 26, 2017: all work will be restricted between 3:00 p.m. and 11:00 p.m. with the following exceptions (dates listed below are based on the current school calendar and are subject to change):
      a. Exception - Summer Break 2017: No time restrictions between June 5, 2017 and August 6, 2017.
   2. Beginning on August 7, 2017: all work will be restricted between 3:00 p.m. and 11:00 p.m. with no exceptions.

1.6 WORK LIMITATIONS

A. All spaces around where work will be done may be occupied by Owner's personnel. Contractor shall limit the scope of its work during times of owner occupancy to prevent disturbing Owner.

B. Contractor shall schedule work in such a manner as to not disrupt mechanical or electrical systems for the existing adjacent buildings during times of Owner occupancy.

C. Contractor shall give Owner a minimum of three (3) days' notice before commencing work in Owner occupied area.

1.7 CONTRACTOR USE OF SITE AND PREMISES

A. Contractor shall confine work at the Project site as permitted by: 1) Law; 2) Permits; 3) the Contract Documents; 4) As instructed by Owner or Owner's representative; and 5) As required for Owner's use of adjacent facilities.

B. Confer with Owner's representative and obtain full knowledge of all Project site rules and regulations affecting work.
C. Contractor shall conform to the Project Site rules and regulations while engaged in its work.
D. Contractor acknowledges that the Project Site rules and regulations take precedence over other rules and regulations that may exist outside such jurisdiction.
E. Contractor shall be obligated to permit the Owner's representative to examine the contractor's list of employees, including those of his subcontractors and their agents, working on the Project Site. Contractor shall
   1. Keep all vehicles, mechanized or motorized equipment locked and secured at all times when parked and unattended on Owner's premises.
   2. Contractor shall not, under any circumstance, leave any vehicle unattended with its motor or engine running, or with its ignition key in place.
   3. All traffic control subject to Owner's representative's approval.
F. Do not unreasonably encumber site with materials or equipment.
G. Contractor shall assume full responsibility for protection safety and safekeeping of products stored on premises.
H. Contractor shall move all stored products or equipment which interferes with operations of Owner or other subcontractors.
I. Contractor shall obtain and pay for the use of additional storage or work areas needed for operations.
J. Contractor shall limit use of the Project Site for work and storage to areas depicted in the drawing or area approved in advance by Owner.
K. The contractor acknowledges that adjacent sites may be used by the Owner or members of the general public requiring contractor to maintain appropriate safety measures.
L. The contractor shall provide access to and from the Project Site as required by law and by Owner:
M. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
N. Arrange use of site and premises to allow:
   1. Work by Owner’s mechanical test, balance and commissioning contractor. The entire building mechanical system shall be tested, balanced and commissioned by Others.

1.8 WORK SEQUENCE

A. Construction services as specified herein shall commence upon issuance of the Letter of Intent to Award a Construction Contract.
B. Certificate of Insurance and all Bonds to be submitted to the Architect within 3 business days upon issuance of the Letter of Intent.
C. All Shop Drawings to be submitted to the Architect within 21 calendar days upon issuance of the Letter of Intent.

SECTION 01100

SUMMARY

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Procedures for preparation and submittal of applications for progress payments.
B. Change order procedures.

1.2 RELATED SECTIONS
A. Section 01210 - Allowances: Payment procedures relating to allowances.
B. Section 01780 - Closeout Submittals.

1.3 SCHEDULE OF VALUES
A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet or Architect approved similar.
B. Submit Schedule of Values in duplicate within 15 days after of the Letter of Intent.
C. Include in each line item, the amount of Allowances specified. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
D. Submit separate quantities and amounts for material and labor for each respective line item.
E. Revise schedule to list approved Change Orders, with each Application For Payment.
F. Support values given with data to substantiate their correctness.
G. Submit quantities of designated materials.
H. List quantities of materials specified under unit prices.
I. Include in the line items a total amount of Contractor's overhead and profit.
J. Payment for materials stored on or off site will be limited to those materials listed separately in Schedule of Values.
K. Form of Submittal
    1. Submit typewritten Schedule of Values on 8-1/2 x 11 paper format.
    2. Utilize the Table of Contents of this Project Manual.
    3. Identify each line item with number and title of the specification Section.
    4. Separate costs under the various phases.
L. Preparation
    1. Itemize separate line cost for each of following cost items:
        a. Overhead and profit.
        b. Bonds.
        c. Insurance.
        d. General Requirements.
        e. Site mobilization.
    2. Itemize separate line item cost for work specified in each section of the specifications. Identify work of:
        a. Contractor's own labor forces.
        b. All subcontractors.
        c. All major suppliers of products or equipment.
    3. Break down installed costs into:
        a. Delivered cost of product, with taxes paid.
        b. Labor cost.
    4. For each line item which has an installed value of more than $10,000.00 break down costs to list amount of labor and amount of materials under each item.
        a. Contractor, subcontractor or supplier.
        b. Specification section number.
        c. Description of work or material.
        d. Quantity.
        e. Unit Price.
        f. Scheduled value.
        g. % of Contract.
    5. Round off figures to nearest ten dollars.

6. Make sum of total costs of all items listed in Schedule equal to total contract sum.

M. Review and Resubmittal
   1. After review by Architect, revise and resubmit Schedule as directed by Architect.
   2. Follow original submittal procedure.

N. Update
   1. Update Schedule of Values when:
      a. Change in cost occurs.
      b. Change of subcontractor or supplier occurs.
      c. Change of product or equipment occurs.
   2. Provide written justification for any changes requested by contractor.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.
B. Present required information in typewritten form.
C. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required or Architect approved equal.
D. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion
   9. Balance to Finish.
   10. Retainage.
E. Each item on the application for payment shall include retaintage in the amount of 10% of the total work completed and stored to date of application. Upon reaching Substantial Completion, and with prior authorization of the Owner and the Architect, the retainage may be reduced to 5% for each item that is deemed substantially complete on the subsequent application for payment.
F. Execute certification by signature of authorized officer.
G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products
H. List each authorized Change Order as a separate line item, for each respective subcontractor or material supplier listing Change Order number and dollar amount as for an original item of Work.
I. Submit three pencil copies of each Application for Payment for review and approval by Architect and Owner.
J. Revise Application and Certificate of payment as directed by Architect.
K. Once pencil copy has been approved by Architect, send three copies along with supporting documentation to the corporate office of the Architect.
L. Include the following with the application:
   1. Transmittal letter as specified for Submittals in Section 01300.
   2. Construction progress schedule, revised and current as specified in Section 01300.
   3. Current construction photographs specified in Section 01300.
   4. Partial release of liens from Contractor for current period.
      a. Release of liens to be provided on forms approved by the Architect prior to the first payment being submitted.
   5. Partial release of liens from all Subcontractors and vendors from prior period.
      a. Release of liens to be provided on forms approved by the Architect prior to the first payment being submitted.
   6. Affidavits attesting to off-site stored products, with original invoices. Statement of transfer of title upon payment and insurance coverage specifically identifying stored items.
M. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application

number and date, and line item by number and description.

1.5 CHANGE ORDER PROCEDURES

A. Promptly implement Change Order procedures.
   1. Provide full written data required to evaluate changes.
   2. Maintain detailed records of work done on time-and-material/force account basis.
   3. Provide full documentation to Architect.

B. Designate in writing the member of Contractor's organization:
   1. Who is authorized to accept changes in Work.
   2. Who is responsible for informing others in Contractor's employ of authorization of changes in Work.
   3. If other than the Owner, the Owner will designate in writing the person(s) authorized to execute Change Orders.

C. Initiation of Contract Changes:
   1. Requests for change by the Contractor shall be initiated in writing.
   2. Subcontractors initiating a request for change shall direct their requests to the Contractor.
   3. The Architect will review and direct the Contractor's requests for change to the Owner or Owner's Representative with recommendations.
   4. Requests for change affecting contract sum or contract completion shall be made prior to starting any changes to the construction work or purchasing of materials. Failure to make appropriate written requests will invalidate any claims for additional costs or time for said work.

D. Owner Authorizes:
   1. The Owner or Owner's Representative, having considered the necessity of the requested change and availability of funds will authorize the Architect to prepare a request for proposal (RFP).

E. Architect Prepares Request for Proposal:
   1. The Architect, following consultation with the Contractor regarding subcontracts which will be affected by the proposed change, will prepare a RFP for Contractor response.
   2. Two sets of the RFP and Supplemental Drawings and Specifications for each proposed change are transmitted to the Contractor.

F. Contractors Prepare Proposals:
   1. Detailed Breakdown of Material Equipment and Labor:
      a. The Contractor or Subcontractor whose work is affected by a proposed change shall prepare a proposal for change.
      b. The detailed breakdown shall be prepared in accordance with the Contract Documents.
      c. If a change affects work covered by agreed on prices, such prices shall be used as the basis for adjustments to the contract sum.
      d. In all other cases, adjustments to the contract sum shall be based on the Contractor's direct cost, including costs of material, labor, equipment, bonds and taxes as applicable.
      e. Labor rates shall be itemized on the detailed breakdown indicating the trade base wage rate, total union fringe benefits, FICA, unemployment compensation insurance and workmen's compensation insurance. Labor charges shall not include costs for inefficiencies of construction supervision or labor.
      f. Change order adjustments to the contract developed above shall include amounts for overhead and profit which do not exceed average amounts indicated in the Schedule of Values, or an amount of 15%, whichever is less, and that no overhead and profit shall be deducted from the total price for changes reducing the cost of the contract. If the changed work is performed by a subcontractor, no more than 10% may be added to the subcontractor's costs for overhead and profit. An additional not to exceed 5% may be included for the Contractor's overhead and profit on all work provided directly by a subcontractor employed on the project.

G. Contractor Reviews:
   1. Reviews: The Contractor shall review all proposals for:
      a. Conformance with the RFP to ensure that all items and only those items of work affected

by the proposed change are included.
b. Assurance that the proposals are submitted in conformance with the Contract Documents.

2. Transmittal: The Contractor shall forward to the Architect three complete sets of proposals with its recommendation regarding the proposal.
   a. In making recommendations, the Contractor shall certify that the price is appropriate and if it is not appropriate, shall state the reasons for not certifying the price.
   b. Proposals, complete with all required information, shall be submitted to the Architect within three weeks of the date of the RFP in order to receive further consideration.

H. Architect Reviews:
1. The Architect reviews the Contractor's proposals for completeness and conformance with the RFP and Contract Documents. Proposals which are incomplete or have inadequate detailed breakdowns will be returned to the Contractors for resubmission.
2. The Architect will review and, when appropriate, approve all price proposals recommending Owner approve issuance of a change order.
3. When the Architect considers the costs or quantities to be inappropriate to the work requested, the Architect will notify the Contractor in writing of the concerns and the Contractor will provide the necessary backup materials to justify the submittal or modify the submittal.
4. Submittals not properly justified will not be forwarded to the Owner and written notice as to the reasons will be forwarded to the Contractor. After 30 days of said written notification and no further response by the Contractor, the request will be considered inappropriate and will receive no further consideration.

I. Architect Issues Change Order:
1. The Architect, having received what is believed to be an appropriate and acceptable Contractor proposal for the proposed change and having received Owner's approval to issue a change order, the Architect will issue a Change Order.
2. The Change Order package prepared by the Architect for submittal to the Owner shall contain the following items:
   a. Three originals of the Change Order form with appropriate original signatures, along with supporting documentation including, but not limited to:
      1) Request for Proposal with signatures.
      2) Pristine copy of drawings and specifications.
      3) On changes initiated by the Architect, a letter explaining the circumstances related to the need for the change.
      4) On Owner requested Change Orders, a letter of request signed by the Owner's Representative.
      5) Change Order Authorization Form for Owner's Signature and permanent record for changes greater than $10,000.00 or 30 Days.

J. Owner Approves or disapproves Change Order: For change in Contract Sum and/or Contract Time.

K. One copy of approved Change Order with original signatures will be returned to the Contractor, or notice and explanation as to why it has been rejected will be forwarded to the Contractor.

1.6 APPLICATION FOR FINAL PAYMENT

A. Submit all closeout documents and comply with all requirements as put forth in Section 01780 - Closeout Submittals.

B. Once closeout submittal have been approved by Architect, prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due; including properly executed Consent of Surety.

C. Application for Final Payment will not be considered until the following have been accomplished:
1. All closeout procedures specified in Section 01780.

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01210

ALLOWANCES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Cash allowances.
B. Payment and modification procedures relating to allowances.

1.2 RELATED SECTIONS
A. Section 01200 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 SELECTION AND PURCHASE
A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
C. Purchase products and systems selected by Architect from the designated supplier.
D. Any unused allowance funds will be credited back to Owner by Change Order prior to close out.

1.4 SUBMITTALS
A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION
A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.
B. Architect Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Allowance Authorization.
C. Contractor Responsibilities:
   1. Assist Architect in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
   4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

1.6 CASH ALLOWANCES
A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
C. Authorized use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins. Refer to Section 01200 for not to exceed amounts for Contractor’s overhead and profit.

SECTION 01210

ALLOWANCES

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Cash Allowance: Include a contingency allowance of $8,000.00 for use according to Owner's instructions.

END OF SECTION

SECTION 01230

ALTERNATES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Alternate submission procedures.
B. Documentation of changes to Contract Sum and Contract Time.

1.2 RELATED SECTIONS
A. Section 00100 – Instructions to Bidders: Instructions for preparation of pricing for alternatives.

1.3 ACCEPTANCE OF ALTERNATES
A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Immediately accepted alternates will be identified in the Owner-Contractor Agreement.
B. The Owner may accept any Alternate within (90) days of the date of contract.
C. State the amount of Alternates prices to be added or deducted from the Base Bid price on the Bid Form.
D. Perform all portions of the work affected by this Section in accordance with the requirements of the Contract Documents.
E. Comply with requirements relative to materials and workmanship contained in the respective specification sections.
F. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.4 SCHEDULE OF ALTERNATES
Alternate No. 1: New Corridor Ceilings and Light Fixtures

State the amount to be ADDED to the lump sum base bid if the corridor ceilings and light fixtures, as identified on the Drawings, are removed and replaced with new.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Preconstruction meeting.
B. Site mobilization meeting.
C. Progress meetings.
D. Construction progress schedule.
E. Progress photographs.
F. Coordination drawings.
G. Submittals for review, information, and project closeout.
H. Number of copies of submittals.
I. Submittal procedures.

1.2 RELATED SECTIONS

A. Document 00700 - General Conditions: Dates for applications for payment.
B. Section 01100 - Summary: Stages of the Work, Work covered by each contract, occupancy,.
C. Section 01200 - Price and Payment Procedures:
D. Section 01325 - Construction Progress Schedule: Form, content, and administration of schedules.
E. Section 01700 - Execution Requirements: Additional coordination requirements.
F. Section 01780 - Closeout Submittals: Project record documents.

1.3 PROJECT COORDINATION

A. Project Coordinator: Contractor.
B. Cooperate with the Contractor in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
C. During construction, coordinate use of site and facilities through the Contractor.
D. Comply with procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
E. Comply with instructions of the Contractor for use of temporary utilities and construction facilities.
    1. Direct and check-out of utilities, operational systems and equipment.
    2. Record dates of start of operation of systems and equipment.
F. Coordinate field engineering and layout work under instructions of the Contractor.
G. Develop and implement procedure for review and processing of applications for progress and final payments: Submit recommendation to Architect for Certification to Owner for Payment.
H. Establish on-site lines of authority and communication; schedule and conduct project meetings among:
    1. Owner's Representative.
    2. Architect.
    3. Subcontractors.
I. Cost Control:
    1. Maintain cost accounting records for authorized work performed under Unit Costs.
    2. Develop and implement procedure for review and processing of applications for progress and final payments: Submit recommendation to Architect for Certification to Owner for Payment.
J. Administer processing of:
    1. Shop drawings, product data and samples.
    2. Field drawings.
    3. Coordination drawings.
    4. Closeout submittals.
K. Maintain Reports and Records at Job Site:
    1. Daily log of progress of work, available to Architect and Owner.
    2. Verify that all subcontractors maintain record documents on a current basis.

3. At completion of Project, assemble record documents from all subcontractors and deliver to the Architect in accordance with Section 01780.
4. Assemble documentation for handling of claims and disputes.

L. Contractor to verify that specified cleaning is done during progress of work and at the completion of each subcontractor's work.
M. Make the following types of submittals to Architect through the Project Coordinator:
1. Requests for interpretation.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Submittals for information.
5. Test and inspection reports.
6. Design data.
7. Manufacturer's instructions and field reports.
8. Applications for payment and change order requests.
9. Progress schedules.
10. Coordination drawings.
11. Closeout submittals.

N. Upon contractor's determination of Substantial Completion of work or portion thereof, notify Architect in writing as to project status and request inspection and compilation of punch list of incomplete or unsatisfactory items.
O. Upon Architect's Certification of Date of Substantial Completion, supervise correction and completion of work within specified period.
P. Upon Contractor's determination that Work is finally complete:
1. Submit written notice to Architect and Owner, that Work is ready for final inspection.
2. Secure and transmit to Architect required closeout submittals as put forth in Section 01780.

Q. Contractor to turn over to Architect for approval all items for closeout as put forth in Section 01780.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION

3.1 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting within 10 days of date of Letter of Intent.
B. Attendance Required:
1. Owner.
2. Architect.
3. Contractor:
4. Field Superintendent
5. Project Manager
6. Safety Representative.
7. Contractor's Major Subcontractors.

C. Minimum Agenda:
1. Items required to be submitted by Contractor at Preconstruction Meeting:
a. Fully executed bonds and Insurance Certificates
b. List of major Subcontractors and suppliers.
c. Tentative construction schedule.
d. Letter from Project Safety Representative certifying that he/she will be empowered as the Contractor's Safety Engineer, is responsible for enforcing all safety requirements and is familiar with the Manual of Accident Prevention in Construction by the Associated General Contractors of America, current edition, and further that the Contractor will maintain at the project a copy of said publication and will strictly enforce the applicable requirements of same.

2. Distribute and discuss documents required to be submitted by Contractor at Preconstruction meeting.
3. Execution of Owner-Contractor Agreement.
4. Identify critical work sequencing.
5. Discussion of schedule of values, and progress schedule.
6. Discussion of list of Subcontractors, list of Products, schedule of values, and progress schedule.
7. Designation of responsible personnel representing the parties to Contract; Owner, Architect and Contractor.
8. Establish chain of Authority.
9. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
10. Scheduling.
    a. Discuss major equipment deliveries and priorities.
11. Review of use of premises:
    a. Office and storage areas.
    b. Access to site and facilities.
12. Owner's requirements.
13. Security procedures.
14. Review requirements of and procedures for maintaining record documents.
15. Architect will record minutes and distribute copies within five days after meeting to participants, with copies to Contractor, Owner, participants, and those directly affected by decisions made.

3.2 SITE MOBILIZATION MEETING

A. Contractor will schedule a meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Special Consultants.
5. Contractor's Superintendent.
6. Major Subcontractors.
7. Safety Representative.

C. Agenda:
1. Use of premises by Owner and Contractor.
2. Owner's requirements and occupancy prior to completion.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Requirements for start-up of equipment.
12. Inspection and acceptance of equipment put into service during construction period.
13. Establish safety and first aid procedures.
14. Procedures and reviews of mock-up panels.

D. Contractor will record minutes and distribute copies within five (5) days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 PROGRESS MEETINGS

A. Contractor will schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
B. Contractor will make arrangements for meetings, prepare agenda with copies for participants 5 business days in advance of meeting date, preside at meetings.
C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.
D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.
   14. Process Payment Requests Monthly.
E. Contractor shall record minutes and distribute copies within Five (5) calendar days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 CONSTRUCTION PROGRESS SCHEDULE - See Section 01325

3.5 PROGRESS PHOTOGRAPHS

A. Provide photographs of site and construction throughout progress of Work.
B. Take photographs as evidence of existing project conditions.

3.6 COORDINATION DRAWINGS

A. Conduct coordination meetings in accordance with each respective section as work progresses. Contractor shall coordinate with Architect for such meetings.
B. Provide information required by Contractor for preparation of coordination drawings.
C. Review drawings prior to submission to Architect.

3.7 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.
B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
C. Samples will be reviewed only for aesthetic, color, or finish selection.
D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

3.8 SUBMITTALS FOR INFORMATION

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

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

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.9 SUBMITTALS FOR PROJECT CLOSEOUT

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

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

3.10 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review or for information:
1. The Contractor has the option of providing Submittals for review or for information either as a hard copy or electronically as outlined below.
2. If Submittal is provided as a hard copy:
a. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Architect.
3. If Submittal is provided electronically:
a. Deliver one copy of submittal to Architect via email or Compact Disc in PDF file format.
b. At Architect’s discretion, the reviewed submittal, with any corrections, will be returned as one electronic copy in PDF format, or as one hard copy delivered to the Contractor.

B. Documents for Project Closeout: Shall be submitted as hard copies only. Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

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

3.11 SUBMITTAL PROCEDURES

A. Sequentially number the transmittal form and clearly indicate the respective specification section number for reference. Revise submittals with original number and a sequential alphabetic suffix.

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

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

D. Deliver submittals to Architect at business address or via email.

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

F. For each submittal for review, allow 10 days excluding delivery time to and from the Contractor.

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

H. Provide space for Contractor and Architect review stamps.

I. Shop drawings which incorporate, in part or in whole, direct reproductions of the contract documents, are not acceptable and will be returned, without review, to the contractor, for resubmittal.

J. All shop drawings which are poorly prepared or hand written will be returned, without review, to the contractor for resubmittal. Architect’s determination of properly prepared shop drawings is final.

K. Electronic Media/Files
   1. Construction drawings for this project have been prepared by the Architect and Engineer utilizing the following Computer Aided Drawing (CAD) System: Auto Cad Release 2015.
   2. Contractors and Subcontractors may purchase electronic media files of the Contract Documents. Selected sheets will cost $250 for all sheets within a single discipline.
   3. Upon request to purchase electronic media or files, the Contractor shall complete the "Request for Electronic Drawing Files" issued by the Architect and issue the appropriate fee to the Architect.
   4. Sheets can be formatted to provide background information only, background plus various layers of equipment; or of complete sheets as issued for construction.
   5. The Contractor may utilize these CAD Drawings in the preparation of their Shop Drawings and as built drawings only.
   6. The information issued is provided in a good faith effort to expedite the Project and simplify the efforts of the Contractor with no guarantee by the issuer as to the accuracy or correctness of the information provided. The Architect accepts no responsibility or liability for the Contractor's or subcontractor's use of these CAD documents.
   7. The use of these CAD documents by the Contractor(s) does not relieve them of their responsibility to field measure existing conditions and to properly fit the work to the Project.
   8. These documents will be provided when purchased for the convenience of the Contractor and this Project. Ownership and use of the issued documents are governed by the terms of the General Conditions.

L. Submittals
   1. **Submit all submittals within 21 calendar days after date of Letter of Intent.** Failure to do so may cause scheduled contractor payments to be withheld.
   2. **Submit all manufacturer's letter's confirming prompt ordering of all material and equipment within 21 calendar days after date of Letter of Intent.** Failure to do so may cause scheduled contractor payments to be withheld. Confirmation Letters are to include the following:
      a. Order date.
      b. Manufacturing date.
      c. Delivery date.
      d. Confirmation that no factors will deter delivery on schedule.
      e. Any other pertinent information.
   3. Submit four prints of shop drawings, and number of copies of product data and samples which Contractor requires for distribution and future submission under Section 01700 plus one copy which will be retained by Architect.
   4. Submit number of samples specified in each of specification sections.
   5. Accompany submittals with transmittal letter, in duplicate, containing:
      a. Date.
      b. Project title and number.
      c. Contractor's name and address.
      d. Relevant Specification section number.
      e. The number of shop drawings, product data and samples submitted.
      f. Notification of any deviations from Contract Documents.
      g. Other pertinent data.
   6. Submittals shall include:
      a. Date and revision dates.
      b. Project title and number.
      c. Names of:
         1) Architect
         2) Architect's consultant(s)
         3) Subcontractor
         4) Sub-subcontractor.
         5) Supplier.
         6) Manufacturer.

7) Separate detailer when pertinent.

d. Identification of product or material.
e. Relation to adjacent structure or material.
f. Field dimensions, clearly identified as such.
g. Specification section and page number.
h. Specified standards, such as ASTM number or Federal Specification.
i. A blank space, 4" x 6" for Architect's stamp.
j. Identification of previously approved deviation(s) from Contract Documents.
k. Identification of color selections required and color selection charts.

7. All shop drawing submittals received by the Architect which do not bear the contractor's approval stamp and initials or signatures will be returned, without review, to the contractor, for resubmittal.
8. All shop drawing submittals which do not contain a reproducible transparency set of the submittal will be returned without review, to the contractor, for resubmittal.

M. Resubmission Requirements
1. Shop Drawings:
a. Definition: Shop Drawings are original drawings prepared by Contractor, subcontractor, sub-subcontractor, supplier or distributor, which illustrates some portion of the work, showing fabrication, layout, setting or erection details.
b. Revise initial drawings as directed and resubmit in accordance with submittal procedures.
c. Indicate on drawings all changes which have been made in addition to those requested by Architect.
d. Clearly indicate by revision number and date, each resubmittal of each shop drawing.
e. When revised for resubmission, identify all changes made since previous submission.
f. Shop drawings which incorporate, in part or in whole, direct reproductions of the contract documents, will NOT be accepted and will be returned without review.
2. Product data and samples: Submit new data and samples as specified for initial submittal.
3. Make all resubmittals within 10 business days after date of Architect's previous review.

N. Distribution of Submittals After Review
1. Contractor will distribute copies of shop drawings and product data which carry Architect's stamp to:
a. Contractor's file.
b. Job site file.
c. Record documents file.
d. Subcontractors.
e. Suppliers.
f. Fabricators.
g. Other contractors as required.
2. Distribute samples as directed in accordance with Contract Documents.
3. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

O. Contractor Responsibilities
1. Review shop drawings, product data and samples prior to submission to the next level of authority.
2. Verify:
a. Field dimensions and drawing dimensions.
b. Field construction criteria.
c. Catalog numbers and similar data.
d. Compliance of items submitted with Contract Documents.
e. Dimensions and elevations requirements necessary to properly install product.
3. Coordinate each submittal with requirements of:
a. The Work.
b. The Contract Documents.
c. The work of other subcontractors.

4. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect/Engineer's review of submittals.
5. Notify Architect in writing prior to submission and specifically on the submittal, of proposed deviations in submittals from contract requirements.
6. Contractor's responsibility for notifying Architect of deviations and for correcting deviations not properly identified in submittals is not relieved by Architect's review of improperly documented submittals.
7. Do not begin any work which requires submittals without having Architect's stamp and initials or signature indicating review.
8. After Architect's review, make response required by Architect's stamp and distribute copies. Indicate by transmittal that copy of approved data has been distributed.
9. Subcontractors:
    a. Subcontractors send their submittals to the Contractor.
    b. Contractor reviews and initials submittals for compliance with scope, coordination and integration with the work of all other subcontractors.
    c. Contractor transmits his reviewed copies of subcontractor's submittals to Architect.
    d. Contractor retains copy of submittals after review by Architect and distributes copies to submitting subcontractor and to other subcontractors for coordination and integration.
    e. Contractor: Enforce resubmission requirements.

P. Architect's Duties
1. Review submittals within 10 business days.
2. Review for compliance to design concept of project.
3. Review all requests for proposed deviations. Obtain Owner's concurrence and respond to Contractor's request.
4. Review of separate item does not constitute review of an assembly in which item functions.
5. Affix stamp, date, and initials or signature certifying to review of submittal, and with instructions for contractor response.
6. Return submittals to Contractor for response or distribution.
7. Select product colors upon receipt of all shop drawings and submittals requiring color selections.

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

END OF SECTION

SECTION 01325

CONSTRUCTION PROGRESS SCHEDULE

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Preliminary schedule.
B. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS
A. Section 01100 - Summary: Work sequence.

1.3 REFERENCES
A. AGC (CPM) - The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry; Associated General Contractors of America; 1976.

1.4 PRECONSTRUCTION MEETING
A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 90 days of Work, with a general outline for remainder of Work
B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
    1. Include written certification that major contractors have reviewed and accepted proposed schedule.
        a. Within 10 days after joint review, submit complete schedule.
D. Submit updated schedule every 30 days or as requested by Architect.
E. Submit the number of opaque reproductions that Contractor requires, plus one copy which will be retained by Architect and Owner. Furnish additional copies when directed.
F. Submit under transmittal letter form specified in Section 01300.

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

1.6 SCHEDULE FORMAT
A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
B. Diagram Sheet Size: Maximum 11x17 inches or width required.
C. Sheet Size: Minimum of 8-1/2 x 11 inches, Maximum of 24" x 36".
D. Scale and Spacing: To allow for notations and revisions.

1.7 START OF CONSTRUCTION SERVICES
A. Construction services as specified herein shall commence upon issuance of the Letter of Intent to Award a Construction Contract.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION

3.1 PRELIMINARY SCHEDULE
A. Prepare (preliminary) schedule in the form of a horizontal bar chart.

3.2 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
B. Identify each item by specification section number.
C. Identify work of separate stages and other logically grouped activities.
D. Provide sub-schedules for each stage of Work identified in Section 01100.
E. Provide sub-schedules to define critical portions of the entire schedule.
F. Include conferences and meetings in schedule.
G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
I. Indicate delivery dates for owner-furnished products.
J. Coordinate content with schedule of values specified in Section 01200.
K. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.
B. Identify the first work day of each week.

3.4 NETWORK ANALYSIS

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
    1. Preceding and following event numbers.
    2. Activity description.
    3. Estimated duration of activity, in maximum 15 day intervals.
    4. Earliest start date.
    5. Earliest finish date.
    6. Actual start date.
    7. Actual finish date.
    8. Latest start date.
    9. Latest finish date.
    10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
    11. Monetary value of activity, keyed to Schedule of Values.
    12. Percentage of activity completed.
    13. Responsibility.
D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and re-computation of all dates and float.
E. Required Reports: List activities in sorts or groups:
    1. By preceding work item or event number from lowest to highest.
    2. By amount of float, then in order of early start.
    3. By responsibility in order of earliest possible start date.
    4. In order of latest allowable start dates.
    5. In order of latest allowable finish dates.
    6. Contractor's periodic payment request sorted by Schedule of Values listings.
    7. Listing of basic input data which generates the report.
    8. Listing of activities on the critical path.

3.5 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.
B. Evaluate project status to determine work behind schedule and work ahead of schedule.
C. After review, revise as necessary as result of review, and resubmit within 5 days.

3.6 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.
B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
C. Annotate diagrams to graphically depict current status of Work.
D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
E. Indicate changes required to maintain Date of Substantial Completion.
F. Submit reports required to support recommended changes.
G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.7 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. References and standards.
B. Quality assurance submittals.
C. Mock-ups.
D. Control of installation.
E. Tolerances.
F. Manufacturers' field services.

1.2 RELATED SECTIONS

A. Section 01210 - Allowances: Allowance for payment of testing services.
B. Section 01300 - Administrative Requirements: Submittal procedures.
C. Section 01600 - Product Requirements: Requirements for material and product quality.

1.3 SUBMITTALS

A. Design Data: Submit for Architect's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
B. Test Reports: After each test/inspection, promptly submit five copies of report to Architect and to Contractor.
    1. Include:
        a. Date issued.
        b. Project title and number.
        c. Testing laboratory name and address.
        d. Name and signature of inspector.
        e. Date and time of sampling or inspection.
        f. Record of temperature and weather.
        g. Identification of product and specifications section.
        h. Location in the Project.
        i. Type of test/inspection.
        j. Date of test/inspection.
        k. Results of test/inspection.
        l. Conformance with Contract Documents.
        m. When requested by Architect, provide interpretation of results.
    2. Test reports are submitted for Architect's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
    1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
    2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
    1. Submit report in duplicate within 30 days of observation to Architect for information.
    2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for

Owner.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.4 REFERENCES AND STANDARDS - See Section 01425

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 CONTRACTOR CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
B. Comply with manufacturers' instructions, including each step in sequence.
C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Have Work performed by persons qualified to produce required and specified quality.
F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, accessories and finishes.
C. Accepted mock-ups shall be a comparison standard for the remaining Work.
D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
C. Where specified tolerances within individual sections exceed those accepted by the Manufacturer, comply with the more astringent tolerances specified.
D. Adjust products to appropriate dimensions; position before securing products in place.

3.4 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
B. Submit qualifications of observer to Architect 30 days in advance of required observations.
   1. Observer subject to approval of Architect.

2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

3.5 DEFECT ASSESSMENT

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

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

END OF SECTION

SECTION 01425

REFERENCE STANDARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Requirements relating to referenced standards.
B. Reference standards full title and edition date.

1.2 RELATED SECTIONS
A. Document 00700 - General Conditions: Reference standards.

1.3 QUALITY ASSURANCE
A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
B. Conform to reference standard of date of issue specified in this section, except where a specific date is established by applicable code.
C. Obtain copies of standards when required by the Contract Documents.
D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
F. Neither the contractual relationships, duties or responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

PART 2 – CONSTRUCTION INDUSTRY ORGANIZATION DOCUMENTS

2.1 AA – ALUMINUM ASSOCIATION, INC.
A. AA ADM-1 - Aluminum Design Manual; 2000.
B. AA DAF-45 - Designation System for Aluminum Finishes; 2003.
C. AA SAAA-46 - Standards for Anodized Architectural Aluminum; 1978.
D. AA BDAS-516161 - Behavior and Design of Aluminum Structures; 1992.

2.2 AABC -- ASSOCIATED AIR BALANCE COUNCIL
A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

2.3 AAMA -- AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION
A. AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; 1997 with revisions contained in "reprinting" of 12/99.
B. AAMA 303 - Voluntary Specification for Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions; 2000.
C. AAMA 501 - Methods of Test for Exterior Walls; 1994.
D. AAMA 501.1 - Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure; 1994 (part of AAMA 501).
E. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 1994 (part of AAMA 501).
F. AAMA 501.3 - Field Check of Water Penetration Through Installed Exterior Windows, Curtain Walls, and Doors by Uniform Air Pressure Difference (part of AAMA 501); 1994.
G. AAMA 603.8 - Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum; 1998.
H. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels; 1998.
I. AAMA 606.1 - Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum; 1976.
J. AAMA 607.1 - Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes

For Architectural Aluminum; 1977.

K. AAMA 608.1 - Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum; 1977.
L. AAMA 609 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum; 2002.
M. AAMA 610.1 - Voluntary Guide Specification for Cleaning and Maintenance of Painted Aluminum Extrusions and Curtain Wall Panels; 1979.
N. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 1998.
O. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals; 2000.
P. AAMA 800 - Voluntary Specifications and Test Methods for Sealants; 1992, Addendums 1994, 2000.
Q. AAMA 802.3 - Compound (Part of AAMA 800); 1992.
R. AAMA 803.3 - Voluntary Specifications and Test Methods for Narrow Joint Seam Sealer (Part of AAMA 800); 1992.
S. AAMA 804.3 - Sealants: Back Bedding Mastic Type Glazing Tapes (Part of AAMA 800); 1992.
T. AAMA 806.3 - Tape (Part of AAMA 800); 1992.
U. AAMA 807.3 - Glazing Tape (Part of AAMA 800); 1992.
V. AAMA 809.2 - Sealants: Non-Drying Sealant (Part of AAMA 800); 1992.

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Temporary sanitary facilities.
B. Temporary Controls: Barriers, enclosures, and fencing.
C. Waste removal facilities and services.

1.2 TEMPORARY SANITARY FACILITIES
A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
B. Provide and maintain a temporary toilet for all workers on the project, in an enclosed, roofed structure housing adequate plumbing fixtures.
C. Portable toilets shall be serviced twice weekly, including emptying tanks, recharging with a germicidal and deodorizing solution and scrubbing entire interior with germicidal solution.
D. As soon as plumbing is installed in building, temporary fixtures may be provided for all workers and portable toilet facilities may be removed from the site.
E. Use of existing facilities is permitted at the Owner’s discretion.
F. Maintain daily in clean and sanitary condition.
G. At end of construction, return facilities to same or better condition as originally found.

1.3 TEMPORARY ENVIROMENTAL CONTROLS
A. Provide controls over environmental conditions at the construction site and related areas under the Contractor's control.
B. Equip internal combustion engines on compressors with mufflers to reduce noise to a minimum. Do not operate in enclosed areas without adequate ventilation.
C. Do not use power actuated tools except where specified in individual specifications
D. Provide dust control materials to minimize dust from construction operations. Prevent air-borne dust from dispersing into the atmosphere.

1.4 BARRIERS
A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
C. Provide protection for plants designated to remain. Replace damaged plants.
D. Provide temporary barriers 4 foot high around each, or around each group of trees and plants at drip line.
E. Carefully supervise excavating, grading, and filling and subsequent construction operations, to prevent damage.
F. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
G. Materials may be new or used, suitable for purpose. Materials at Contractor's options, appropriate for purpose. Do not violate code requirements.

1.5 CONSTRUCTION AIDS
A. Provide and maintain all miscellaneous temporary facilities such as ladders, ramps, scaffolds, hoists, railings, chutes, barricades, enclosures, platforms, walks, etc., as required for the proper execution of the Work.
B. Materials may be new or used, suitable for purpose. Comply with specified codes and standards.
C. Consult with Owner's representative, review site conditions and factors which affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the work.
D. Installation:
   1. Comply with respective Project Manual Specifications Sections.
   2. Relocate construction aids as construction progresses to expedite storage or work requirements and to accommodate legitimate requirements of Owners and other contractors at the site.

1.6 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition. Do not burn or bury rubbish on project site.
B. Provide additional collections and disposal of debris whenever regular schedule is inadequate to prevent accumulation.
C. Provide containers with lids. Remove trash from site periodically.
D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
F. Prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
G. Provide equipment and personnel; perform emergency measures to contain all spillages, and to remove contaminated soils or liquids.
H. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewer.
I. Provide systems for control of atmospheric pollutants.
J. Cleaning
    1. Maintain areas under Contractor's control free of waste materials, debris and rubbish.
    2. Remove debris and rubbish from closed or remote spaces, prior to closing the space.
    3. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

1.7 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary equipment, facilities, and materials prior to Substantial Completion.
B. Clean and repair damage caused by installation or use of temporary work.
C. Restore existing facilities used during construction to original condition.
D. Restore new permanent facilities used during construction to specified condition.
E. Completely remove fences and barriers, including foundations when construction has progressed to the point that they are no longer needed, and when approved by the Architect.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. General product requirements.
B. Transportation, handling, storage and protection.
C. Product option requirements.
D. Substitution limitations and procedures.
E. Procedures for Owner-supplied products.
F. Spare parts and maintenance materials.

1.2 RELATED SECTIONS
A. Document 00100 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
B. Section 01400 - Quality Requirements: Product quality monitoring.

1.3 REFERENCES
A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2002.

1.4 SUBMITTALS
A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product; submit 3 copies to Architect.
   1. Submit within 20 days after date of Letter of Intent.
   2. For products specified only by reference standards, list applicable reference standards.
B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
C. Shop Drawing Submittals: Prepared specifically for this Project.
D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
F. Provide name and address of similar projects on which product was used and date of installation.
G. Provide detailed description and drawings illustrating construction methods.
H. Provide itemized comparison and accurate cost data of proposed substitution in comparison with product or method specified.
I. Provide data relating to changes in contracts, coordination issues, and construction schedules.
J. Manufacturer's Instructions: When Contract Documents specify that installation shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to all parties involved in the installation, including three copies to the Architect.

PART 2 – PRODUCTS

2.1 NEW PRODUCTS
A. Provide new products unless specifically required or permitted by the Contract Documents.
B. Motors: Refer to Section 15065, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
C. Materials and Equipment Incorporated Into The Work
   1. NO MATERIAL OR PRODUCT SHALL BE DELIVERED TO, PROVIDED FOR OR INSTALLED ON PROJECT WHICH CONTAINS ANY ASBESTOS OR ASBESTOS-CONTAINING MATERIAL.
   2. Conform to project specifications and standards.
   3. Comply with size, make, type and quality specified.

4. Manufactured and fabricated products:
   a. Design, fabricate and assemble in accord with best engineering and shop practices.
   b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
   c. Two or more items of the same kind shall be identical from the same manufacturer.
   d. All parts of systems shall be from the same manufacturer to the greatest extent practicable.
   e. Adhere to equipment capacities, sizes and dimensions shown or specified unless variations are specifically approved by Change Order.

2.2 PRODUCT OPTIONS

A. Base all bids on providing all products exactly as specified.
B. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
C. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.3 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.
B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 – EXECUTION

3.1 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
B. Architect will consider requests for substitutions only within 20 days after date of Letter of Intent.
C. Substitutions may be considered at a later date only when a product becomes unavailable through no fault of the Contractor.
D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
E. For products specified only by reference or performance standards, select any product which meets or exceeds standards, by any manufacturers, subject to the Architect's approval.
F. For products specified by naming several products or manufacturers, select any product and manufacturer named which conforms to the intent of the documents.
G. Substitutions, Bidder/Contractor Options
   1. Prior to Bid Opening: The Architect will consider written requests to amend the bidding documents to add products not specified provided such requests are received at least 10 calendar days prior to bid opening date. Requests received after that time will not be considered. When a request is approved, the Architect will issue an appropriate addendum not less than three calendar days prior to the bid opening.
   2. With Bid: A bidder may propose substitutions with his bid by completing the Substitution Sheet with the Bid Form, subject to the provisions stated thereon. Architect will review Substitution Sheet of low bidder and recommend approval or rejection by Owner prior to award of Contract.
   3. After Award of Contract: No substitutions will be considered after Notice of Award except under one or more of the following conditions:
      a. Substitutions required for compliance with final interpretations of code requirements or insurance regulations.
      b. Unavailability of specified products, through no fault of Contractor or subcontractor.
      c. Subsequent information discloses inability of all specified products to perform properly or

to fit in designated space.
   d. Manufacturer/fabricator refusal to certify or guarantee performance of specified product as specified.
   e. When a substitution would be substantially beneficial to the Owner.

H. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

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

J. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The Architect will notify Contractor in writing of decision to accept or reject request.
   4. Complete data substantiating compliance of proposed substitution with Contract Documents.
   5. For products:
      a. Product identification, including manufacturer's name and address.
      b. Manufacturer's literature:
         1) Product description.
         2) Performance and test data.
         3) Reference standards.
      c. Samples.
      d. Name and address of similar projects on which product was used and date of installation.
   6. For construction methods:
      a. Detailed description of proposed method.
      b. Drawings illustrating methods.
   7. Itemized comparison of proposed substitutions with product or method specified.
   8. Data relating to changes in construction schedules.
   9. Identify:
      a. Other contract affected.
      b. Changes or coordination required.
   10. Accurate cost data on proposed substitution in comparison with product or method specified.

K. Provide cost data that is complete and includes all related costs under Bidder/Contractor contract, but excludes:
   1. Costs under separate contracts.
   2. Architect's redesign.
   3. Administrative costs of Architect.

3.2 OWNER-SUPPLIED PRODUCTS

A. See Section 01100 - Summary for identification of Owner-supplied products.

B. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

5. Arrange for manufacturer's warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
B. Transport and handle products in accordance with manufacturer's instructions.
C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
D. Arrange for transportation and deliveries of materials and equipment in accordance with approved current construction schedules and in ample time to facilitate inspection prior to installation.
E. Coordinate deliveries to avoid conflict with work and condition at site.
F. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible. Clearly mark partial deliveries of component parts of assemblies or equipment to permit easy identification of parts and to facilitate assembly.
G. Lift packages, equipment, or components only at designated lift points.
H. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
I. Provide equipment and personnel, including those furnished by Owner, to handle products by methods to prevent soiling, disfigurement, or damage.
J. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
B. Store and protect products in accordance with manufacturer's instructions.
C. Store with seals and labels intact and legible.
D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product. Materials may be new or used at Contractor's option, but shall be non-staining, non-hazardous, and of sufficient strength and durability for proposed use.
E. Submittals
   1. Request for allocation of storage space.
   2. List of materials and equipment to be stored.
   3. Proposed location for storage.
   4. Special storage requirements.
   5. Schedule of anticipated storage dates.
F. For exterior storage of fabricated products, place on sloped supports above ground.
G. Provide bonded off-site storage and protection when site does not permit on-site storage or protection. Off-site storage will be permitted only on Owner's prior written authorization in accordance with General Conditions.
H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
J. Prevent contact with material that may cause corrosion, discoloration, or staining.
K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
M. Locate storage areas where authorized by Architect, Contractor will resolve conflicts in storage

requirements of all subcontractors. Do not inhibit use of:

1. Fire exits.
2. Fire lanes.
3. Parking.
4. Work of other contractors.
5. Owner.

N. Provide separate storage for combustible and non-combustible products. Store combustible materials in accordance with Fire Protection Agency's regulations.

O. Remove all temporary storage, contents and utilities at completion of construction activities or when requested by the Architect.

END OF SECTION

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.
B. Pre-installation meetings.
C. Cutting and patching.
D. Cleaning and protection.
E. Starting of systems and equipment.
F. Demonstration and instruction of Owner personnel.
G. Closeout procedures, except payment procedures.

1.2 RELATED SECTIONS

A. Section 01300 - Administrative Requirements: Submittals procedures.
B. Section 01400 - Quality Requirements: Testing and inspection procedures.
C. Section 01500 - Temporary Facilities and Controls: Temporary exterior enclosures.
D. Section 01780 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
E. Section 07840 - Firestopping.
F. Section 15990 - HVAC Systems: Testing, Adjusting and Balancing

1.3 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
    1. On request, submit documentation verifying accuracy of survey work.
    2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents. Include the following data:
    3. Architect may at any time require written verifications of grades, lines and levels by a licensed surveyor as work progresses.
    4. All areas found to be non-conforming to the Contract Documents shall be corrected by the responsible Contractor.
    5. Submit surveys and survey logs for the project record.
C. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
    1. Structural integrity of any element of Project.
    2. Integrity of weather exposed or moisture resistant element.
    3. Efficiency, maintenance, or safety of any operational element.
    4. Visual qualities of sight exposed elements.
    5. Work of Owner or separate Contractor.
    6. Include in request:
        a. Identification of Project.
        b. Location and description of affected work.
        c. Necessity for cutting or alteration.
        d. Contractor and crafts to execute the work.
        e. Description of proposed work and products to be used.
        f. Extent of refinishing.
        g. Alternatives to cutting and patching.
        h. Effect on work of Owner or separate Contractor.
        i. Written permission of affected separate Contractor.
        j. Date and time work will be executed.
D. Designation of party responsible for cost of cutting and patching.
E. When conditions of work, or schedule, indicate change of materials or methods, submit recommendation to Architect, including:
    1. Condition indicating change.
    2. Recommendation for alternative materials or methods.

3. Submittals specified for substitutions.

F. Submit written notice to Architect, designating time work will be uncovered, to provide for observation.

G. Payment for Costs:
   1. Costs caused by ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of Architect - party responsible for ill timed, rejected or non-conforming work.
   2. Work done by change order, other than defective or non-conforming work - Owner.

1.4 QUALIFICATIONS

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

1.5 PROJECT CONDITIONS

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

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

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

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

F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.6 COORDINATION

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

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

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

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

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

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

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

PART 2 – PRODUCTS

2.1 PATCHING MATERIALS

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

B. Type and Quality of Existing Products: Determine by inspecting and testing products where

necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
B. Verify that demolition is complete in alterations areas and areas are ready for installation of new work.
C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
D. Examine and verify specific conditions described in individual specification sections.
E. Verify in field all measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.
F. Verify that utility services are available, of the correct characteristics, and in the correct locations.
G. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.
B. Require attendance of parties directly affecting, or affected by, work of the specific section.
C. Notify Architect four days in advance of meeting date.
D. Prepare agenda and preside at meeting:
    1. Review conditions of examination, preparation and installation procedures.
    2. Review coordination with related work.
E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.5 CUTTING AND PATCHING

A. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to

complement adjacent work, and to fit products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
C. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
E. Restore work with new products in accordance with requirements of Contract Documents.
F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.
H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
I. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
J. In addition to contract requirements, upon written instructions of Architect.
    1. Uncover work to provide for observation of covered work.
    2. Remove samples of installed materials for testing.
K. Do not endanger work by cutting or altering work or any part of it.
L. Do not cut or alter work without written consent of Architect.
M. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.6 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.7 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.
B. Provide special protection where specified in individual specification sections.
C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
G. Prohibit traffic from landscaped areas.
H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.8 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems with Architect and Owner's Representative..

B. Notify Architect and owner two days prior to start-up of each item.
C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
E. Verify that wiring and support components for equipment are complete and tested.
F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
G. When specified in individual specification Sections, require manufacturer and/or equipment supplier to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.9 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
E. Perform instruction in a classroom environment located at the school.
F. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
H. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.
I. Air and Water Testing, Adjusting and Balancing
    1. Testing, balancing and commissioning will be done by Others.
    2. Adjusting the system will be part of the mechanical contract.
    3. The mechanical subcontractor will perform services specified in Division 15.
    4. Reports will be submitted by Others to the Architect indicating observation and results of test and indicating compliance or non-compliance with the specified requirements and with the requirements of the Contract Documents.

3.10 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.
B. Testing, adjusting, and balancing HVAC systems: See Section 15990 and 01400.

3.11 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.
    1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
B. Use cleaning materials that are non-hazardous.
C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
E. Clean filters of operating equipment.
F. Clean debris from roofs, gutters, downspouts, and drainage systems.
G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
I. Contractor provide final cleaning at completion of work, or at such other times as directed by the Architect, remove all waste, debris, rubbish, tools, equipment, machinery and surplus materials. Clean all sight exposed surfaces; leave work clean and ready for occupancy.
J. Safety Requirements
    1. Standards: Maintain project in accord with following safety and insurance standards:
        a. Federal and state regulations.
        b. National Fire Protection Association (NFPA).
    2. Hazards Control:
        a. Store volatile wastes in covered metal containers and remove from premises daily.
        b. Prevent accumulation of wastes which create hazardous conditions.
        c. Provide adequate ventilation during use of volatile or noxious substances.
    3. Conduct cleaning and disposal operations to comply with Federal and State anti-pollution laws.
        a. Do not burn or bury rubbish and waste materials on project site.
        b. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
        c. Do not dispose of wastes into streams or waterways.
K. Submittals
    1. Manufacturer's recommendations for cleaning specified products.
    2. Proposed cleaning products for products where manufacturer's recommendations are not specified.
L. Materials
    1. Select and use all cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.
    2. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
    3. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
M. Final Cleaning
    1. Employ experienced workers or professional cleaners for final cleaning.
    2. Remove grease, dust, dirt, stains, labels, fingerprints, protection and other foreign materials from sight-exposed finished surfaces.
        a. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed surfaces, and of concealed spaces to insure performance.
    3. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
    4. Soft broom clean all exposed concrete surfaces clean; other paved areas with soft or stiff broom as directed. Rake clean other surfaces on grounds.
    5. Sweep and mop clean all resilient, quarry and ceramic flooring.
    6. Vacuum all carpeting.
    7. Remove ice and snow from access to buildings.
    8. Replace air handling and conditioning filters if units were operated during construction.
    9. Clean all ductwork used for temporary heating.
    10. Clean windows and mirrors to be free from labels, dust, fingerprints and other foreign materials.
    11. Maintain finally cleaned areas until project, or designated portion thereof, is accepted by Owner.

3.12 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
    1. Provide copies to Architect and Owner.
B. Contractor to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
C. Notify Architect when work is considered ready for Substantial Completion.
D. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for

Architect's review.

E. Substantial Completion Meeting will be scheduled by Architect. Architect will issue notice of meeting.
   1. Agenda will consist of the inspection, discussion of the punch list, determination of final completion dates, and the date and time the Owner will take occupancy. Architect will also review the requirements for contractor closeout in accord with the contract documents.
   2. Upon completion of this meeting, the Architect shall prepare the Certificate of Substantial Completion with the completed punch list and forward the package to the Contractor.
F. Owner will occupy all of the building as specified in Section 01100.
G. Contractor will correct items of work listed in punch list and comply with requirements for access to Owner-occupied areas.
H. Notify Architect when work is considered finally complete.
I. Accompany Architect on final inspection.
J. Complete items of work determined by Architect's final inspection.

3.13 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections for one year from date of Final Payment.
B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Project Record Documents.
B. Operation and Maintenance Data.
C. Warranties and bonds.

1.2 RELATED SECTIONS
A. Conditions of the Contract: Performance bond and labor and material payment bonds, warranty, and correction of work.
B. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
C. Section 01700 - Execution Requirements: Contract closeout procedures.
D. Individual Product Sections: Specific requirements for operation and maintenance data.
E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS
A. Substantial Completion
    1. When Contractor considers work substantially complete, submit written declaration to Architect that work, or designated portion thereof, is substantially complete. Include list of items to be completed or corrected.
    2. Architect will make a preliminary inspection within seven business days after receipt of Contractor's declaration.
    3. Upon determining that work is substantially complete, Architect will:
        a. Prepare a punch list of items to be completed or corrected, as determined by the inspection.
        b. Prepare and process a certificate of substantial completion, containing:
            1) Date of substantial completion.
            2) Punch list of items to be completed or corrected.
            3) The time within which punch list items shall be completed or corrected.
            4) Date and time Owner will take occupancy of project or designated portion thereof.
            5) Responsibilities of Owner and Contractor for:
                a) Insurance
                b) Utilities.
                c) Operation and maintenance of mechanical, electrical and other systems.
                d) Maintenance and cleaning.
                e) Security
            6) Signatures of:
                a) Architect
                b) Contractor.
                c) Owner.
    4. Contractor:
        a. Complete all work listed for completion or correction within designated time.
        b. Perform final cleaning in accordance with 01700.
    5. At time of inspection, should substantial completion not be certified, complete the work and resubmit declaration in accord with Paragraph A.1 above.
B. Final Completion
    1. Contractor:
        a. Submit written declaration to Architect that:
            1) Work complies with all aspects of Contract Documents.
            2) All items on substantial completion punch list have been completed or corrected.
            3) All tools, construction equipment and surplus materials have been removed from site.
            4) Required surveys have been completed and verified.
    2. Architect will make final inspection with Contractor to ensure completion of all contract requirements.

3. When Architect considers that all work is finally complete in accordance with contract document requirements, he will prepare and process closeout documents.

C. Application for Final Payment
   1. Contractor submit duly executed:
      a. Final Affidavit and Sworn Statement.
      b. Contractor's Final Waiver of Lien.
      c. Separate releases of waivers of liens for all subcontractors, suppliers and others with lien rights against property of Owner, together with complete list of those parties.
      d. Final accounting statement, reflecting all adjustments to contract sum.
         1) Original contract sum.
         2) Additions and deductions resulting from:
            a) All change orders.
            b) Deductions for uncorrected work.
            c) Deductions for liquidated damages.
      e. Total contract sum, as adjusted.
      f. Previous payments.
      g. Sum remaining due.
   2. Architect will process final statement in accordance with Conditions of the Contract.

D. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
   1. Accompany submittal with transmittal letter, in duplicate, containing:
      a. Date.
      b. Project title and number.
      c. Contractor's name and address.
      d. Title and number of each record document.
   2. Certification that each document submitted is complete and accurate.
      a. Signature of contractor, or his authorized representative.
   3. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit one hard copy set and two Compact Disc containing electronic copies (in PDF file format) of revised final documents in final form within 10 days after final inspection.

E. Operation and Maintenance Data:
   1. The contractor shall cause each mechanical and electrical subcontractor to provide the Contractor with three hard copies and one electronic copy of all operating manuals at the time of delivery of each major piece of equipment.
   2. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   3. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   4. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   5. Submit two hard copy sets and two Compact Disc containing electronic copies (in PDF file format) of revised final documents in final form within 10 days after final inspection.

F. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.
   4. Because the warranty period begins with the issuance of the final payment from The School Corporation to the general contractor, all warranties should include the verbiage "…for a

period of (X) year(s) after the date The School Corporation issues the final payment to the General Contractor…"

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Contractor and all subcontractors shall maintain an accurate record of deviations and changes from the Contract Documents which occur in the work.
B. Indicate all such deviations and changes on a record set of the Contract Documents and turn same over to the Architect and Owner upon completion of the Work all such documents and information such as final shop drawings and sketches, marked prints and similar data indicating the as-built conditions.
C. Create an electronic copy of all approved Project Record Documents in PDF file format and deliver to Architect and Owner on Compact Disc.
D. Compact Discs: High quality CD-R format Compact Disc formatted for use by Microsoft Windows based computers. Rewriteable Compact Discs will not be accepted. Provide labels on all Compact Discs listing the Owner's name, Project name, Contractor's name, Date of Submittal, and the title "Project Record Documents".
E. Maintain on site one set of the following record documents; record actual revisions to the Work:
    1. Drawings.
    2. Project Manual.
    3. Interpretations and supplemental instructions.
    4. Specifications.
    5. Addenda.
    6. Change Orders and other modifications to the Contract.
    7. Reviewed shop drawings, product data, and samples.
    8. Manufacturer's instruction for assembly, installation, and adjusting.
    9. Other modifications to contract.
    10. Field test records.
    11. All schedules.
    12. Correspondence file.
F. Ensure entries are complete and accurate, enabling future reference by Owner.
G. Store record documents separate from documents used for construction.
H. Record information concurrent with construction progress.
I. File documents in format in accord with Project Manual Table of Contents.
J. Do not use record documents for field construction purposes.
K. Make documents available at all times for inspection by Architect and Owner.
L. Plans and sections of all concealed work, particularly concealed piping and conduit, and deviations from conditions shown on the contract drawings, shall be shown and dimensioned on the "as-built" drawings.
M. Contractor shall develop layout drawings for all concealed work that is schematically indicated on contract drawings.
N. Provide red colored pencils or felt marking pens for marking devices.
O. Do not permanently conceal any work until specified information has been recorded.
P. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
    1. Manufacturer's name and product model and number.
    2. Product substitutions or alternates utilized.
    3. Changes made by Change Order or Field Order.
    4. Other matters not originally specified.
Q. Label each record document "PROJECT RECORD DOCUMENTS" in large print. Keep record

documents current.

R. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Changes made by change order.
   6. Details not on original Contract drawings.

S. Shop Drawings: Maintain as record documents; legibly annotate drawings to record changes made after review.

3.2 OPERATION AND MAINTENANCE DATA

A. Compile product data and related information appropriate for Owner's maintenance and operation of products and equipment provided under the Contract.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Coordinate drawings with information in Product Record Documents to assure correct illustration of completed installation. Do not use Project Record Documents as maintenance drawings.

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

F. Warranty, Bond, and Service Contract: Provide information sheet for Owner's personnel with proper procedures in event of failure and instances which might affect validity of warranties of bonds.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. Submit three hard copies and two Compact Discs with electronic copies (in PDF file format) of complete manual in final form.

B. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

C. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

D. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

E. Additional information as specified in individual product specification sections.

F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. Submit three hard copies and two Compact Discs with electronic copies (in PDF file format) of complete manual in final form.

B. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
D. Include color coded wiring diagrams as installed.
E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
G. Provide servicing and lubrication schedule, and list of lubricants required.
H. Include manufacturer's printed operation and maintenance instructions.
I. Include sequence of operation by controls manufacturer.
J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
K. Provide control diagrams by controls manufacturer as installed.
L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
O. Include test and balancing reports.
P. Additional Requirements: As specified in individual product specification sections.

3.5 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
B. Prepare data in the form of an instructional manual.
C. Submit one copy of completed instruction manual 15 business days prior to final inspection or acceptance.
    1. Copy will be returned after final inspection or acceptance, with comments.
D. Binders: Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
E. Compact Discs: High quality CD-R format Compact Disc formatted for use by Microsoft Windows based computers. Rewriteable Compact Discs will not be accepted. Provide labels on all Compact Discs listing the Owner’s name, Project name, Contractor’s name, Date of Submittal, and the title “Operation and Maintenance Manuals”.
F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
G. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
J. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
K. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
    1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
    2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
        a. Significant design criteria.
        b. List of equipment.

c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
a. Shop drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Photocopies of warranties and bonds.

L. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

M. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.6 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers and provide electronic copies of all warranties and bonds in PDF file format on two Compact Discs.

F. Compact Discs: High quality CD-R format Compact Disc formatted for use by Microsoft Windows based computers. Rewriteable Compact Discs will not be accepted. Provide labels on all Compact Discs listing the Owner’s name, Project name, Contractor’s name, Date of Submittal, and the title “Warranties and Bonds”.

G. Binder Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Firestopping materials.
B. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on drawings or not, and other openings indicated.

1.2 REFERENCES
A. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.3 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on product characteristics and fire rating.
C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE
A. Fire Testing: Provide firestopping assemblies of designs which provide the specified fire ratings when tested in accordance with methods indicated.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors, or meeting any two of the following requirements:.
   2. With minimum 3 years documented experience installing work of this type.
   3. Able to show at least 5 satisfactorily completed projects of comparable size and type.
   4. Licensed by authority having jurisdiction.
   5. Approved by firestopping manufacturer.

1.5 MOCK-UP
A. Install one firestopping assembly representative of each fire rating design required on project.
   1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
   2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.
B. If accepted, mock-up will represent minimum standard for the Work.
C. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 – PRODUCTS

2.1 FIRESTOPPING ASSEMBLIES
A. Firestopping at Control and Expansion Joints (without Penetrations), of widths 2 inches or less: Any material meeting requirements.
   1. Floor-to-Floor:
      a. UL Design No. FF-DD-0002, FF-D-0005, F Rating 1 & 2 hour.
      b. UL Design No. FF-D-0011, FF-D-0001, F Rating 3 hour.
   2. Floor-to-Wall:
      a. UL Design No. FW-D-0004, FW-D-0005, FW-D-0002, F Rating 1 & 2 hour.

b. UL Design No. FFW-D-0007, FW-D-0002, F Rating 3 hour.

3. Wall-to-Wall:
   a. UL Design No. WW-D-0013, WW-D-0004, WW-D-0017, F Rating 1 & 2 hour.
   b. UL Design No. WW-D-0013, WW-D-0001, F Rating 3 hour.
4. Head-of-Wall:
   a. UL Design No. HW-D-0020, HW-D-0043, HW-D-0034, F Rating 1 & 2 hour.
   b. UL Design No. HW-D-0060, HW-D-0061, F Rating 3 hour.

B. Firestopping at Metallic Pipe, Conduit, or Tubing Penetrations, of diameter 4 inches or less; for single penetrations: Any material meeting requirements.
1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-1014, C-AJ-1240, C-AJ-1149, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1058, C-AJ-1198, C-AJ-1155, F Rating 3 hour.
2. Concrete Floors 5 inches in thickness or greater:
   a. UL Design No. C-AJ-1004, C-AJ-1005, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1004, C-AJ-1005, F Rating 3 & 4 hour.
3. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-1014, C-AJ-1240, C-AJ-1149, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1058, C-AJ-1198, C-AJ-1155, F Rating 3 hour.
4. Roof Slabs 5 inches in thickness or greater:
   a. UL Design No. C-AJ-1004, C-AJ-1005, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1004, C-AJ-1005, F Rating 3 & 4 hour.
5. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-1014, C-AJ-1240, C-AJ-1149, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1058, C-AJ-1198, C-AJ-1155, F Rating 3 hour.
6. Concrete/Masonry Walls 8 inches in thickness or greater:
   a. UL Design No. C-AJ-1004, C-AJ-1005, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1004, C-AJ-1005, F Rating 3 & 4 hour.
7. Framed Floors:
   a. UL Design No. F-C-1002, F-C-1010, F-C-1059, F Rating 1 & 2 hour.
8. Framed Walls:
   a. UL Design No. W-L-1001, W-L-1049, W-L-1054, F Rating 1 & 2 hour.
   b. UL Design No. W-L-1001, W-L-1172, F Rating 3 hour.

C. Firestopping at Metallic Pipe, Conduit, or Tubing Penetrations, of diameter 4 inches or less; for multiple penetrations: Any material meeting requirements.
1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-1092, C-AJ-1047, C-AJ-1140, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1234, F Rating 3 hour.
2. Concrete Floors 5 inches in thickness or greater:
   a. UL Design No. C-AJ-1003, F Rating 1 & 2 hour.
3. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-1092, C-AJ-1047, C-AJ-1140, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1234, F Rating 3 hour.
4. Roof Slabs 5 inches in thickness or greater:
   a. UL Design No. C-AJ-1003, F Rating 1 & 2 hour.
5. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-1092, C-AJ-1047, C-AJ-1140, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-1234, F Rating 3 hour.
6. Concrete/Masonry Walls 8 inches in thickness or greater:
   a. UL Design No. C-AJ-1003, F Rating 1 & 2 hour.
7. Framed Floors:
   a. UL Design No. F-C-1065, F-C-1066, F Rating 1 & 2 hour.
8. Framed Walls:
   a. UL Design No. W-L-1001, W-L-1049, W-L-54, F Rating 1 & 2 hour.
   b. UL Design No. W-L-1001, W-L-1172, F Rating 3 & 4 hour.

D. Firestopping at Non-Metallic Pipe, Conduit, or Tubing Penetrations, of diameter 4 inches or less;

for single penetrations: Any material meeting requirements.

1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-2143, C-AJ-2063, C-AJ-2271, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2117, C-AJ-2038, C-AJ-2271, F Rating 3 hour.
2. Concrete Floors 5 inches in thickness or greater:
   a. UL Design No. C-AJ-2001, C-AJ-2002, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2001, C-AJ-2002, F Rating 3 & 4 hour.
3. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-2143, C-AJ-2063, C-AJ-2271, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2117, C-AJ-2038, C-AJ-2271, F Rating 3 hour.
4. Roof Slabs 5 inches in thickness or greater:
   a. UL Design No. C-AJ-2001, C-AJ-2002, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2001, C-AJ-2002, F Rating 3 & 4 hour.
5. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-2143, C-AJ-2063, C-AJ-2271, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2117, C-AJ-2038, C-AJ-2271, F Rating 3 hour.
6. Concrete/Masonry Walls 8 inches in thickness or greater:
   a. UL Design No. C-AJ-2001, C-AJ-2002, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2001, C-AJ-2002, F Rating 3 & 4 hour.
7. Framed Floors:
   a. UL Design No. F-C-2024, F-C-2020, F-C-2025, F Rating 1 & 2 hour.
8. Framed Walls:
   a. UL Design No. W-L-2162, W-L-2047, W-L-2075, F Rating 1 & 2 hour.
   b. UL Design No. W-L-2162, W-L-2195, F Rating 3 hour.

E. Firestopping at Non-Metallic Pipe, Conduit, or Tubing Penetrations, of diameter 4 inches or less; for multiple penetrations: Any material meeting requirements.

1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-2093, C-AL-2140, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2092, F Rating 3 hour.
2. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-2093, C-AL-2140, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2092, F Rating 3 hour.
3. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-2093, C-AL-2140, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-2092, F Rating 3 hour.
4. Framed Floors:
   a. UL Design No. F-C-2115, F-C-2129, F-C-2158, F Rating 1 & 2 hour.
5. Framed Walls:
   a. UL Design No. C-AJ-2021, W-L-2032, F Rating 1 & 2 hour.

F. Firestopping at Cable Tray Penetrations: Any material meeting requirements.

1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-4003, C-AJ-4020, C-AJ-4017, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-4003, C-AJ-4020, C-AJ-4017, F Rating 3 hour.
2. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-4003, C-AJ-4020, C-AJ-4017, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-4003, C-AJ-4020, C-AJ-4017, F Rating 3 hour.
3. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-4003, C-AJ-4020, C-AJ-4017, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-4003, C-AJ-4020, C-AJ-4017, F Rating 3 hour.
4. Framed Walls:
   a. UL Design No. W-L-4004, W-L-4005, W-L-4011, F Rating 1 & 2 hour.

G. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Any material meeting requirements.

1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-3030, C-AJ-3133, C-AJ-3072, F Rating 1 & 2 hour.

b. UL Design No. C-AJ-3030, C-AJ-3023, C-AJ-3072, F Rating 3 hour.

2. Concrete Floors 5 inches in thickness or greater:
   a. UL Design No. C-BK-3001, C-BK-3002, F Rating 1 & 2 hour.
   b. UL Design No. C-BK-3001, C-BK-3002, F Rating 3 hour.
3. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-3030, C-AJ-3133, C-AJ-3072, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-3030, C-AJ-3023, C-AJ-3072, F Rating 3 hour.
4. Roof Slabs 5 inches in thickness or greater:
   a. UL Design No. C-BK-3001, C-BK-3002, F Rating 1 & 2 hour.
   b. UL Design No. C-BK-3001, C-BK-3002, F Rating 3 hour.
5. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-3030, C-AJ-3133, C-AJ-3072, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-3030, C-AJ-3023, C-AJ-3072, F Rating 3 hour.
6. Concrete/Masonry Walls 8 inches in thickness or greater:
   a. UL Design No. C-BK-3001, C-BK-3002, F Rating 1 & 2 hour.
   b. UL Design No. C-BK-3001, C-BK-3002, F Rating 3 hour.
7. Framed Floors:
   a. UL Design No. F-C-3002, F-C-3045, F-C-3012, F Rating 1 & 2 hour.
8. Framed Walls:
   a. UL Design No. W-L-3110, W-L-3076, W-L-3065, F Rating 1 & 2 hour.
   b. UL Design No. W-L-3139, F Rating 3 hour.

H. Firestopping at Insulated Piping: Any material meeting requirements.
1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5045, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5061, F Rating 3 hour.
2. Concrete Floors 5 inches in thickness or greater:
   a. UL Design No. C-BK-5001, C-BK-5002, F Rating 1 & 2 hour.
   b. UL Design No. C-BK-5001, C-BK-5002, F Rating 3 hour.
3. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5045, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5061, F Rating 3 hour.
4. Roof Slabs 5 inches in thickness or greater:
   a. UL Design No. C-BK-5001, C-BK-5002, F Rating 1 & 2 hour.
   b. UL Design No. C-BK-5001, C-BK-5002, F Rating 3 hour.
5. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5045, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5061, F Rating 3 hour.
6. Concrete/Masonry Walls 8 inches in thickness or greater:
   a. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5045, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-5001, C-AJ-5058, C-AJ-5061, F Rating 3 hour.
7. Framed Floors:
   a. UL Design No. F-C-5038, F-C-5055, F-C-5029, F Rating 1 & 2 hour.
8. Framed Walls:
   a. UL Design No. W-L-5011, W-L-5014, W-L-5029, F Rating 1 & 2 hour.
   b. UL Design No. W-L-5101, W-L-5023, W-L-5085, F Rating 3 hour.

I. Firestopping at Miscellaneous Electrical Penetrants such as Busducts: Any material meeting requirements.
1. Concrete Floors 5 inches in thickness or less:
   a. UL Design No. C-AJ-6002, C-AJ-6003, C-AJ-6006, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-6002, C-AJ-6003, C-AJ-6006, F Rating 3 hour.
2. Roof Slabs 5 inches in thickness or less:
   a. UL Design No. C-AJ-6002, C-AJ-6003, C-AJ-6006, F Rating 1 & 2 hour.
   b. UL Design No. C-AJ-6002, C-AJ-6003, C-AJ-6006, F Rating 3 hour.
3. Concrete/Masonry Walls 8 inches in thickness or less:
   a. UL Design No. C-AJ-6002, C-AJ-6003, C-AJ-6006, F Rating 1 & 2 hour.

b. UL Design No. C-AJ-6002, C-AJ-6003, C-AJ-6006, F Rating 3 hour.
4. Framed Walls:
a. UL Design No. W-L-6002, W-L-6001, W-L-6004, F Rating 1 & 2 hour.

J. Firestopping at Miscellaneous Mechanical Penetrants such as Air Ducts: Any material meeting requirements.
1. Concrete Floors 5 inches in thickness or less:
a. UL Design No. C-AJ-7013, C-AJ-7047, F Rating 1 & 2 hour.
b. UL Design No. C-AJ-7003, C-AJ-7046, F Rating 3 hour.
2. Roof Slabs 5 inches in thickness or less:
a. UL Design No. C-AJ-7013, C-AJ-7047, F Rating 1 & 2 hour.
b. UL Design No. C-AJ-7003, C-AJ-7046, F Rating 3 hour.
3. Concrete/Masonry Walls 8 inches in thickness or less:
a. UL Design No. C-AJ-7013, C-AJ-7047, F Rating 1 & 2 hour.
b. UL Design No. C-AJ-7003, C-AJ-7046, F Rating 3 hour.
4. Framed Floors:
a. UL Design No. F-C-7001, F-C-7002, F-C-7013, F Rating 1 & 2 hour.
5. Framed Walls:
a. UL Design No. W-L-7041, W-L-7025, W-L-7040, F Rating 1 & 2 hour.

K. Firestopping at Groupings of penetrations including any combination of items above: Any material meeting requirements.
1. Concrete Floors 5 inches in thickness or less:
a. UL Design No. C-AJ-8001, C-AJ-8016, C-AJ-8041, F Rating 1 & 2 hour.
b. UL Design No. C-AJ-8001, C-AJ-8016, C-AJ-8041, F Rating 3 hour.
2. Roof Slabs 5 inches in thickness or less:
a. UL Design No. C-AJ-8001, C-AJ-8016, C-AJ-8041, F Rating 1 & 2 hour.
b. UL Design No. C-AJ-8001, C-AJ-8016, C-AJ-8041, F Rating 3 hour.
3. Concrete/Masonry Walls 8 inches in thickness or less:
a. UL Design No. C-AJ-8001, C-AJ-8016, C-AJ-8041, F Rating 1 & 2 hour.
b. UL Design No. C-AJ-8001, C-AJ-8016, C-AJ-8041, F Rating 3 hour.
4. Framed Walls:
a. UL Design No. W-L-8013, W-L-8016, F Rating 1 & 2 hour.
b. UL Design No. W-L-8014, W-L-8015, F Rating 3 hour.

L. Firestopping between Edge of Floor Slab and Curtain Wall (without Penetrations): Glass fiber or mineral fiber safing insulation; UL Design No.F-C-7001, F Rating 1 hour.

M. Temporary Firestopping: Intumescent pillows; UL Design No. C-AJ-2020, F Rating 1-1/2 hour; provide at locations indicated on drawings.

2.2 MATERIALS

A. Manufacturers:
1. 3M Fire Protection Products.
2. Firestop Systems, Inc..
3. Hilti Construction Chemicals, Inc..
4. Isolatek International.
5. Johns Mansville International, Inc..
6. Specified Technologies, Inc.
7. Tremco.
8. Substitutions: See Section 01600 - Product Requirements.

B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant. Type required for tested assembly design.
1. Color: Dark grey.

C. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers. Type required for tested assembly design.
1. Color: Dark grey.

D. Fiber Packing Material: Mineral fiber packing insulation. Type required for tested assembly design.

E. Foil Tape: Nominal 3 mil. thick pressure sensitive aluminum foil tape. Type required for tested assembly design.
F. Firestop Devices: Mechanical device with incombustible filler and galvanized steel jacket, collar, and flanged stops. Type required for tested assembly design.
G. Intumescent Composite Sheet: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet. Type required for tested assembly design.
H. Hangers: Minimum 1 inch wide strips of minimum 0.034 inch (20 gauge) galvanized steel sheet. Type required for tested assembly design.
I. Fire Spray: Sprayable, flexible, water-based coating that is water-resistant. Type required for tested assembly design.
J. Caulks: Single component, water-based, non-flammable, paintable coating with non-sag and low shrinkage characteristics. Type required for tested assembly design.
K. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar. Type required for tested assembly design.
L. Primers, Sleeves, Forms, and Accessories: Type required for tested assembly design.

PART 3 – EXECUTION

3.1 EXAMINATION
A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION
A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
B. Remove incompatible materials which may affect bond.
C. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION
A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

3.4 CLEANING AND PROTECTION
A. Clean adjacent surfaces of firestopping materials.
B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Sealants and joint backing.

1.2 REFERENCES
A. ASTM C 834 - Standard Specification for Latex Sealants; 2000.
B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 2002.
C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2002.
D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.
E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam); 1997.

1.3 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.4 QUALITY ASSURANCE
A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience and approved by manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS
A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.6 WARRANTY
A. See section 01780 – Closeout Submittals, for additional warranty requirements.
B. Correct defective work within a five year period after the 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

2.1 MANUFACTUERS
A. Silicone Sealants:
   1. Bostik Findley; www.bostikfindley-us.com.
   2. GE Plastics: www.geplastics.com.
   3. Pecora Corporation: www.pecora.com.
   4. Sonneborn, ChemRex, Inc; www.chemrex.com.
   5. Dow Corning: www.dowcorning.com
   6. Tremco, Inc: www.tremcosealants.com.
   7. Substitutions: See Section 01600 - Product Requirements.
B. Polyurethane Sealants:
   1. Bostik Findley; www.bostikfindley-us.com.
   2. Pecora Corporation: www.pecora.com.
   3. Sonneborn, ChemRex, Inc; www.chemrex.com.
   4. Tremco, Inc: www.tremcosealants.com.
   5. Substitutions: See Section 01600 - Product Requirements.
C. Butyl Sealants:
   1. Bostik Findley; www.bostikfindley-us.com.
   2. Pecora Corporation: www.pecora.com.
   3. TEC Specialty Products Inc.
   4. Tremco, Inc: www.tremcosealants.com.

5. Substitutions: See Section 01600 - Product Requirements.

D. Preformed Compressible Foam Sealers:
   1. Emseal Joint Systems, Ltd: www.emseal.com.
   2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
   3. Polytite Manufacturing Corporation: www.polytite.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.2 SEALANTS

A. Type S1 - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component.
   1. Color: As selected by Architect from Manufacturer's full line of colors.
   2. Applications:
      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.

B. Type S2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
   1. Color: As selected by Architect from Manufacturer's full line of colors.
   2. Applications:
      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 sealant is indicated.

2.3 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; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter which might 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 C 1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 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 C 1193.

C. Perform acoustical sealant application work in accordance with ASTM C 919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

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.

3.4 CLEANING

A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

3.6 SCHEDULE

A. Exterior Joints for Which No Other Sealant Type is Indicated: Type S1; colors as selected.
B. Interior Joints for Which No Other Sealant is Indicated: Type S2.

END OF SECTION

SECTION 09511

SUSPENDED ACOUSTICAL CEILINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Acoustical ceiling panels.
B. Suspension system.
C. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.2 RELATED SECTIONS
A. Section 01230 – Bid Alternate work.
B. Division 15 – Air Outlets and Inlets
C. Division 16 – Lighting Fixtures.
D. Division 16 – Fire Alarm and Detection System.

1.3 REFERENCES
A. Unless noted otherwise, the most current issue of the reference shall be used.
B. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
C. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
D. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
E. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
F. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
G. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
H. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
I. ASTM E 580 – Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
J. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
K. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
L. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products.
M. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
N. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
O. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate grid layout and related dimensioning.
C. Product Data: Provide data on suspension system components.
D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
E. Samples: Submit two samples of each panel type; 12 x 12 inch in size illustrating material and finish of acoustical units.
F. Samples: Submit two samples of each suspension system type; 12 inches long, of main runner, cross runner, and perimeter molding.
G. Manufacturer’s Installation Instructions: Indicate special procedures.

1.5 QUALITY ASSURANCE

A. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
B. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
   1. Flame Spread: 25 or less
   2. Smoke Developed: 50 or less
C. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 PROJECT CONDITIONS

A. All ceiling products and suspension systems must be installed and maintained in accordance with manufacturer’s written installation instructions for that product in effect at the time of installation and best industry practice.
B. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32°F and 120°F and not subject to Abnormal Conditions. Abnormal conditions include exposure to chemical fumes, vibrations, moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.
C. 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.
D. Install acoustical units after interior wet work is dry.

1.9 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
B. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
C. Grid System: Rusting and manufacturer's defects
D. Acoustical Panels designated as inherently resistive to the growth of micro-organisms: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
E. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.10 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.
B. Provide 10 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 – PRODUCTS

2.1 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc.: www.armstrong.com
   2. CertainTeed Ceilings: www.certainteed.com
   3. USG Interiors, Inc.: www.usg.com
   4. Substitutions: See Section 01600 - Product Requirements.

B. Acoustical Units - General: ASTM E 1264, Class A.

C. Acoustical Panels – Type I: Painted mineral fiber, ASTM E 1264 Type III, with the following characteristics:
   1. Size: 24 x 48 inches.
   2. Thickness: 5/8 inches.
   3. Composition: Wet felted.
   4. Density: 1.05 lb/cu ft.
   5. Light Reflectance: 84 percent, determined as specified in ASTM E 1264.
   6. NRC Range: .55 to .65, determined as specified in ASTM E 1264.
   7. Edge: Square.
   8. Surface Color: White.
   9. Surface Pattern: Non-directional fissured.
   10. Products:
      a. Armstrong: “Fine Fissured Medium Texture #1729”.
      b. CertainTeed: “Vantage 10 #VAN-197”.
      c. USG Interiors: “Radar ClimaPlus #2410”.
   11. Suspension System: Exposed grid.

2.2 SUSPENSION SYSTEMS

A. Manufacturers:
   1. Armstrong World Industries, Inc.: www.armstrong.com
   2. USG Interiors, Inc.: www.usg.com
   3. Chicago Metallic Corp.; www.chicagometallic.com
   4. Substitutions: See Section 01600 - Product Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, and perimeter moldings as required.

C. Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee, 15/16 inch wide face.
   2. Finish: White painted.

D. Exposed Aluminum Suspension System: Narrow-Face, Single-Web, Extruded-Aluminum Suspension System: Main and cross runners formed from extruded aluminum to produce structural members; intermediate-duty.
   1. Profile: Tee, 15/16 inch wide face.
   2. Face Finish: Painted white.

2.3 ACCESSORIES

A. Support Channels and Hangers: Match material and finish of suspension system; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as suspension system.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Gasket for Perimeter Moldings: Closed cell rubber sponge tape.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that layout of hangers will not interfere with other work.
C. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, 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. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
E. 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.
F. 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.
G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
I. Do not eccentrically load system or induce rotation of runners.
J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
    1. Install with continuous gasket.
    2. Use longest practical lengths.
    3. Overlap and rivet corners.
K. Coordinate all existing pipe, conduit, and power pole penetrations through ceiling system. Provide trim plates at all penetrations to match finish of ceiling grid.

3.3 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 and finish as factory edges.
G. Coordinate all existing pipe, conduit, and power pole penetrations through ceiling system. Provide trim plates at all penetrations to match finish of ceiling grid.

3.4 ERECTION 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.

3.5 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.
B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.
C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 15050

MECHANICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General Conditions and Special Provisions, Division 1, apply to work of Division 15.

B. This Section is a part of each Division 15 Section as applicable to the work specified therein.

1.2 DESCRIPTION OF WORK:

A. Extent of mechanical work is indicated on drawings and/or specified in other Division 15 Sections.

B. Piping and equipment demolition.

C. Pumps, piping and accessories

D. Fire protection sprinkler system modifications.

E. Transfer air grilles and accessories.

F. Piping insulation.

G. Temperature control system modifications.

H. Drain down and refill the existing hot water heating piping system and restore water treatment levels.

I. Other work shown or specified in Division 15 Sections.

1.3 DEFINITIONS:

A. Phrase "exposed to view" indicates that pipes, and similar items so referenced, insulated or otherwise, are to remain visible (not concealed) in the completed structure.

B. Phrases "in concealed spaces" or "not exposed to view" indicate that pipes, and similar items so referenced, insulated or otherwise, are concealed and not exposed to view and are within furred spaces, above suspended ceilings, in pipe chases, or similar enclosures.

C. Phrases "unfinished spaces" and "unfinished rooms" refer to areas such as Storage Rooms, Mechanical Equipment Rooms, and similar spaces.

D. Phrases "finished areas" and "finished rooms" refer to rooms or spaces such as offices, corridors, or similar inhabited areas.

E. Phrase "piping" refers to all piping systems described within Division 15 specifications.

F. Wherever the term "--this MECHANICAL DIVISION--" is used, such term means this DIVISION 15 and includes every section in DIVISION 15.

G. Wherever the term "--provide--" is used, such term means that the mechanical trade shall furnish and install the subject equipment and/or material, or both.

H. Whenever the term "--install--" is used, such term means that the mechanical trade shall install only the subject equipment and/or material, or both.

I. Wherever the term "--furnish--" is used, such term means that the mechanical trade shall furnish only the subject equipment and/or material.

1.4 QUALITY ASSURANCE:

A. Work shall be in complete accordance with codes, rules, or ordinances and regulations of authorities, bodies, associations, governments, etc. having proper and/or legal jurisdiction. Specifically, the following requirements shall be met in their entirety:
   1. State, federal, and local rules, regulations, codes, statutes, Illinois Life Safety Code, and ordinances.
   2. National Fire Protection Association - all applicable requirements.
   3. National Board of Fire Underwriters (U.L., Inc., label).
   4. National Electric Code - all applicable requirements.
   5. Other codes and standards as specifically noted in each Section of the contract documents.

1.5 TESTS AND INSPECTIONS:

A. Conduct tests and inspections as specified and as required to assure proper installation and operation of systems. Do not allow work to be enclosed or concealed prior to required testing or observation. Where testing or inspections are required to be performed by others, cooperate fully therewith and provide safe access to components and systems as required.

1.6 MATERIALS AND CHANGES:

A. It is intended that materials or products specified by the name of the manufacturer or the brand or trade name or the catalog reference shall be the basis of the estimate and furnished under the contract unless changed by mutual agreement. Where there are two (2) or more brands named, the choice of these shall be optional, subject to approval. See Instructions to Bidders.

B. Changes in the work from the contract documents shall not be made unless written authorization for the change has been provided. Claim for an addition to or deduction from the contract sum shall not be valid unless so ordered.

C. The materials required for the performance of the work shall be new and the best of their respective kinds and of uniform pattern throughout the work.

1.7 LAWS AND ORDINANCES:

A. Work shall be executed and inspected in accordance with rules, regulations, laws, and ordinances of the local, federal, city, county, and state authorities, and the utility companies serving the area in which the installation is to be made.

B. If there is a discrepancy between the codes and regulations having jurisdiction over the installation and these contract documents, the codes and regulations shall determine method of equipment used.

C. If there is anything in the contract documents that will not strictly comply with the above laws, ordinances, and rules, a written request for a clarification shall be submitted before proceeding with that part of the work. No changes in the contract documents shall be made without written consent.

D. All changes made after the letting of the contract, in order to comply with the applicable codes or requirements of the enforcing inspectors, shall be made without additional cost.

1.8 CERTIFICATES AND FEES:

A. Give all necessary notices, obtain all necessary permits, and pay all fees in order that the work hereinafter specified may be carried out. Furnish all certificates necessary as evidence that the work installed conforms to the laws and regulations of authorities having jurisdiction. Before final certificates are issued, make changes and alterations required by authorized inspector of an authority having jurisdiction.

1.9 DRAWINGS:

A. The contract documents are not intended to include work and material required for the full completion of the systems outlined. Contract documents are schematic and indicate the intended systems and their function. Materials, work, or details required for the proper execution and completion of the work described or shown and shall be furnished and installed as a part of this contract, without extra charge.

B. The contract documents indicate the general location of equipment and the route to be followed by the piping which is to be installed. Piping, and equipment shall be installed in such a way as to conserve head room and interfere as little as possible with the free use of the space through which they pass. Prepare interference drawings where required or requested.

C. Consult architectural contract documents for necessary changes or additions to accommodate existing or structural conditions. The location of pipes, and equipment shall be altered without charge before installation. Obtain written approval before making alteration.

D. As the work progresses and before installing equipment which may interfere with the interior treatment or use of the building, obtain drawings or instructions for the exact location of such equipment.

E. Cooperate with other trades so that piping, etc. will not interfere with the work.

1.10 COORDINATION:

A. Lay out work to be installed in coordination with each trade engaged on this project. Cooperate with trades in order to coordinate work and eliminate conflicts between this work and that of other trades. Cooperate with trades to coordinate work to maintain maximum accessibility and serviceability to equipment, dampers, valves, etc.

B. Be fully responsible for conflicts between this work and that of other trades engaged on this project.

C. Grilles, piping, or mechanical equipment which has been installed without checking for interferences and without maintaining maximum accessibility and serviceability shall be modified without additional expense.

D. Supply, to other trades, equipment to be built-in by them or measurements to allow necessary openings to be left.

E. Trade priority list shall be as follows unless directed otherwise:
   1. Electrical Lighting Fixtures
   2. Mechanical Grilles and Diffusers
   3. Mechanical Ductwork
   4. Electrical Conduit
   5. Piping Systems

1.11 JURISDICTION OF WORK:

A. When it becomes necessary for the complete fulfillment of this work or to furnish labor or materials other than that which is generally accepted by trade agreement or general practice to belong to a particular trade or branch of work, the contractor shall procure to a contractor engaged in the trade or branch of work involved to the end that there shall be no delay to or stoppage of work due to infringement of trade agreements as to jurisdiction.

1.12 WORKMANSHIP:

A. Only first class workmanship will be accepted - not only as regards to safety, efficiency, durability, etc. - but also as regards to the neatness of detail. Pipe work must be lined up paralleling or at right angles to the building walls. Equipment must be accurately set, plumbed, and leveled, and hanger rods must be in true vertical alignment. In general, the entire work throughout shall present a neat and clean appearance on completion.

1.13 RECORD DRAWINGS:

A. On a clean set of blueline prints, clearly mark, as the work progresses, changes and deviations from systems, layouts, etc. shown on the contract documents, so that, on completion of the work, there will be a record of the exact location of ductwork, piping and equipment.

B. Transfer notes and changes in a neat, clear manner to one (1) complete set of bond documents. Submit one (1) complete set of field documents, two (2) sets of prints, and one (1) electronic file showing complete mechanical contract documents with changes correctly shown for review.

1.14 SUBMITTALS:

A. Submit a minimum of six (6) copies of detail drawings of each piece of all equipment, piping layout, etc. All equipment, and piping, etc. installed before submission and review of shop drawings is subject to removal and relocation at no additional cost as directed.

B. Be responsible for fitting this equipment into the space allotted. No additional charges will be allowed for additional, pipe, or other appurtenances later required by reason of substitution of equipment. Provide detailed shop drawings showing layout within the space, including details of piping, etc. for systems under this Division. Be responsible to layout equipment, and piping in conjunction with other trades and structure. Be responsible to locate piping so as not to interfere with access to equipment, dampers, valves, etc. Be responsible to layout equipment, valves, etc. for maximum accessibility and as per manufacturer's recommendations. Equipment, piping, etc. installed with interference to accessibility is subject to removal and relocation at no additional cost, as directed. Be responsible to provide the proper quantity of valves, equipment, dampers, etc.

C. Review of shop drawings is rendered as a service only and shall not be considered as a guarantee of measurements, quantities or of building conditions, nor shall it be construed as a release of basic responsibilities under the contract. Equipment, piping, etc. installed before submission and review of shop drawings is subject to removal and relocation at no additional cost.

D. Shop drawings shall be examined prior to submittal. Shop drawings submitted shall be signed or initialed by contractor and shall bear contractor's stamp of approval, evidencing that the shop drawing has been examined and checked to be in accordance with contract requirements. Shop drawings which are submitted, which do not bear such indication or approval, shall be construed as not having been examined, checked, and approved. Reproductions of design drawings submitted as shop drawings will not be acceptable.

E. Failure to comply with the above mentioned requirements, including failure to indicate approval as indicated above, will be cause for drawings to be returned for resubmission in proper manner.

F. When the shop drawings show variations from contract requirements because of shop practice or other reasons, specific reference to such variation in the letter of transmittal shall be made in order that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, there will be no relief of the responsibility for executing the work in accordance with contract documents, even though such shop drawings have been reviewed.

1.15 SHOP DRAWING SUBMITTALS:

A. Submittals shall be required for the following items, and for additional items where required for a complete and operational system:
   1. Piping Anchors
   2. Pipe Hangers and Supports
   3. Pipe material, joints and fitting.
   4. Pipe Valves.
   5. Pipe Service Marking.
   6. Vibration Isolation Equipment.
   7. Piping Distribution System Plans.
   8. Warranty and Maintenance Schedule.
   9. Owner instruction and System Demonstration Schedule and Agenda.
   10. Operation and Maintenance Manuals.

1.16 EXISTING CONDITIONS:

A. Visit site and become fully acquainted with the conditions at the building site, as contract for this work shall be based upon furnishing labor and materials required to complete each installation ready for continuous and satisfactory operation.

B. Before commencing the work, examine the work of other trades and report at once defect or interference affecting the work under this Division or the guarantee of same.

C. No extras will be allowed on account of a claim that the extent of the work of this Division was not fully understood.

D. Verify in field exact location of existing piping, equipment, etc. indicated on the contract documents as being demolished, reused or tied into. Adjust work as required to meet field conditions.

E. Take measurements at the building and be responsible for the correctness of same and the proper fitting of work.

F. Adjust work to fit actual job conditions.

1.17 EXISTING HAZARDS:

A. Field verify if existing asbestos will be encountered prior to starting work. Provide prompt notification if asbestos is present. It will be the contractor's responsibility to take steps necessary to protect persons involved with construction and persons at and in the vicinity of the site from asbestos until asbestos abatement services are provided by the Owner. In addition, by signing a contract with the Owner, the contractor assumes liabilities resulting from asbestos exposure in connection with this project and agrees to hold the Owner and Architect/Engineer harmless in regard to this matter.

1.18 DEMOLITION:

A. Provide demolition of the existing systems as indicated on the contract documents and as required to complete the installation of the new work.

B. Existing branch piping, etc. to be removed shall be terminated at the main in an approved air and water tight manner.

C. Unused piping, registers, fixtures, equipment, etc. not wanted by the Owner shall be removed from the site. Items requested by the Owner shall be stored on site as directed.

D. Verify exact size, location and quantities of demolition work in field.

E. The scheduling of the demolition work shall be coordinated, and temporary materials and/or equipment required to maintain building operation shall be provided at no additional cost.

1.19 OWNER'S OPERATION:

A. The Owner presently is engaged in his normal business activities at this location and will continue his operations during the work.

B. The necessity of the Owner maintaining the operation of his business shall be respected. Work, men, material storage, and equipment used shall be conducted so that it will minimize the interference with his operations of that business.

C. Coordinate phasing of work and provide temporary services, piping, controls, etc. as required for the implementation of work while maintaining services to portions of buildings that are to remain occupied. No additional cost will be allowed if temporary services were not included in bids.

D. Provide a minimum of 48 hour notice and obtain authorization from Owner prior to shutdown of systems or service serving occupied portions of the facility.

1.20 USE OF WORK BY OWNER:

A. The Owner reserves the right of use, or caused to be used, previous to acceptance and final payment, portions of the work which have been observed or tested. The use of such work or equipment shall not be construed, deemed, assumed, or taken as an acceptance of the work in part or as whole.

PART 2 – PRODUCTS

2.1 ANCHORS:

A. Type of anchors and method of securing same to structural framing of the building shall be subject to review.

B. Piping shall be installed free from building structure to allow for movement without noise. Install fire spread and smoke developed rating insulation as required by code and acceptable to local authorities around pipes when they pass through floor slabs or walls.

2.2 SUPPORTS:

A. Supply and erect special structural steel work required for the installation of equipment and other apparatus. Set apparatus at least 4" above floor or to a height indicated on the contract documents. Supply and install anchor bolts and other fastenings. Concrete bases and concrete floating pads, where called for, shall be provided. Concrete bases and pads shall be 4" larger than the base of the apparatus.

2.3 PIPE HANGERS:

A. Hangers, brackets, and clamps shall be of standard weight or malleable iron as specified for each use. Pipes supported from concrete construction shall use approved concrete inserts. Perforated strap hangers are not permitted.

B. Supports and hangers shall be so constructed and adjusted as to allow for proper pitch and expansion of pipes.

C. Provide necessary structural supports for piping to properly transmit load to building structure. Hangers shall not be supported from bottom chord of truss or lightweight metal flooring or roof decking.

D. Where three (3) or more pipes are run parallel, they shall be supported on trapeze hangers. Use trapeze hangers where ducts interfere with piping. There shall be at least one (1) hanger for each section of pipe.

E. Except as noted elsewhere, install pipe hangers equal to Grinnell, Midwest Hanger Supply Co., or Bergen-Paterson. Pipe hangers for insulated piping shall be sized such that insulation will pass through hanger uninterrupted. Pipe hangers installed in corrosive areas, or exposed to moisture, or exposed to the outside elements shall be galvanized finish. Provide temporary wood blocks of same thickness as pipe insulation to support piping on hangers prior to insulation. Provide piping hangers as follows:
   1. Adjustable clevis hanger for stationary insulated steel pipe lines:
      a. Anvil Fig. 300
      b. Erico #415
      c. Bergen-Paterson Part 6752

F. Pipe hangers shall be supported by mild steel hanger rods affixed to the building structure with approved steel fasteners. Rods, nuts, and fasteners shall be provided in accordance with hanger manufacturer's requirements. Hangers and rods shall not penetrate piping insulation. Vertical risers shall be supported by riser clamps at each floor line.

G. The maximum spacing between hangers and supports, measured along the piping, shall be as follows:

Pipe Material	Pipe Size	Rod Dia.	Max Spacing
Steel Pipe	Up to 1 ¼”	3/8”	8’
	1 ½” & 2”	3/8”	10’
	2 ½” & 3”	½”	15’
	4” & Up	5/8”	15’

H. Materials shall be as follows:
   1. Trapeze Hangers: 1-1/2 x 1-1/2" x 1/8" angle with 3/4" rods.
   2. Pipe Shields:
      a. Anvil Fig. 168 Rib-Loc shield
      b. Erico #125 for IPS and copper non-rib type
   3. Riser Clamps:
      a. Anvil Fig. 261
      b. Erico #510

c. Bergen-Paterson Part 6302

4. Riser Clamps For Copper Tubing:
   a. Anvil Fig. CT-121
   b. Erico #511
   c. Bergen-Paterson Part 6303
5. Beam Clamps, Rods, Supports, etc. for attachment to steel beams and bar joist: Grinnell, Erico, or Bergen-Paterson.

2.4 JOINTS:

A. Make joints in horizontal suspended cast iron hub and spigot pipe with push fit rubber gaskets.

B. Make joints in below ground cast iron hub and spigot pipe with push fit rubber gaskets.

C. PVC pipe joints shall be assembled with a solvent cement approved by the pipe manufacturer. Pipe shall be cut square and edges shall be reamed and cleaned prior to joining pipe. Apply solvent cement evenly around the entire outside diameter of pipe and the inside diameter of socket. Insert pipe to the full socket depth of fittings and rotate pipe or fitting 1/4 turn to ensure complete and even distribution of the solvent cement. The complete installation shall be as recommended by the manufacturer.

D. Make joints in plain end pipe or mechanical joint pipe with couplings approved for the service.

E. Solder joints in copper pipe shall be 95/5 lead free silfoss solder.

F. Make joints between copper pipe and galvanized pipe with dielectric isolating couplings or bushings.

G. Ream threaded joints carefully and joint with compound on male thread only.

H. Underground copper piping shall be silfossed.

I. Make joints in hubless cast iron piping with neoprene gasket with stainless steel bands approved for the service.

J. Joints in plain end tile shall be made with butyl gaskets and encased stainless steel bands and in bell and spigot tile as specified for concrete pipe.

K. The Rigid Pro-Press, Apollo, or Viega copper pipe joining, valves, and fitting system may be used for hot water heating systems in lieu of as specified above. Pipe fittings to conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EDPM. Copper press fitting shall be installed in accordance with the manufacturer's installation instructions.

2.5 PIPE AND FITTINGS:

A. No bull headed tees shall be used on water piping.

B. Pipe for the services listed below shall be ASTM A53.
   1. The following pipe shall be Schedule 40, except 12" size and larger, shall be standard weight.

      a. Hot water heating (black steel)

C. Black steel pipe 2-1/2" and larger shall have welded joints except at valves and connections to apparatus, where flanges must be installed. Use butt welding fittings specifically made by manufacturers for all elbows and tees for branches, except as noted.
   1. Welded Fittings:
      a. Welded fittings shall be Tube-Turn or equal, 125 psi design. Use groove type welding rings on 4" or larger equal to or larger than one-half (1/2) the nominal diameter of the main.

b. Use weldolets or welding tees for branches less than one-half (1/2) nominal diameter of the main. Welding heavy weight steel coupling into any mains instead of using a weldolet (where permitted above) only on low-pressure mains under 50 psi working pressure is acceptable.

D. Steel pipe 2-1/2" and smaller, except as noted above, may have screwed joints with long lengths connected by couplings. Where fittings are necessary, they shall be standard weight malleable iron screwed fittings of approved make and ground joint brass lined unions shall be used where necessary and at connections with apparatus. No field fabricated fittings will be permitted unless specifically noted otherwise.

E. Seamless Type "L" copper tubing, conforming to ASTM Specification B-88 and Federal Specification WW-T-799, of approved manufacturer may be used in lieu of black steel pipe for the heating water system. Fittings for copper tubing 2-1/2" and smaller shall be wrought sweat type fittings. Fittings in copper tubing 3" and larger may be cast red bronze solder type fittings. Fittings shall have tubing stops.

F. Where copper pipe connections are made to piping or an item of equipment of a dissimilar metal, provide dielectric fitting as herein specified.

G. Pipes shall be straight, true, and parallel and supported at intervals specified above or as indicated on the contract documents. Run piping with proper slope to drain and vent. Branch pipes shall have greater slope.

2.6 VALVES:

A. Supply and install valves on main branches and at equipment, tanks, pumps, and elsewhere as shown or as required. Valves shall have minimum 125 psi pressure rating and shall be as shown or as required to suit job conditions.

B. Valves shall be of same make and figure number. Valves shall be NIBCO, Milwaukee Valve, Stockham, Crane, Watts or approved equal and shall be of domestic manufacture.

C. Piping to and from equipment shall have necessary shutoff valves, full size of line for isolating such equipment on system side of unions or flanges. Provide shutoff valves to isolate each item of equipment, plumbing fixture, pipe riser or pipe branch.

D. Valves shall be placed to permit easy operation and access. Provide chain wheel operator with sufficient chain to operate valve for valves mounted above 7'-0".

E. Valves for hot water heating systems shall be as listed below:

1. Globe Valves:

a. Valves 2" and smaller shall be of Class 150 with body and union bonnet of ASTM B-62 bronze, gland packed, N.A. packing. Bronze trim, composition disc.

Recommended Valve:
THD
NIBCO #T-235-Y
Milwaukee Valve #590T
Hammond IB413T
SJE
NIBCO #S-235-Y
Milwaukee Valve #1590-T
Hammond IB423-T

b. Valves 2-1/2" and larger shall be Class 125 body, bronze trim, with body and bonnet conforming to ASTM A-126 Class B cast iron, flanged ends with N.A. packing.

Recommended Valves:
NIBCO #F-718-B
Milwaukee Valve #F2981-A

Hammond IR116

2. Ball Valves:
   a. Valves shall have cast bronze bodies, replaceable teflon seats, conventional port, blowout-proof stem, adjustable packing gland, chrome plated ball and threaded ends, 600 WOG.
   b. Recommended Valves:
   NIBCO #T-585/580-70
   Milwaukee Valve #BA-100/150
   Apollo 70-100/200 Series
   Hammond 8501
3. Check Valves:
   a. Valves 2-1/2" and larger shall be Class 125 iron body bronze trim, conforming to material requirements of ASTM A-126 Class B. Flanged ends, swing type disc.
   Recommended Valves:
   NIBCO #F-918-B
   Milwaukee #F2974-A
   Hammond IR1124
4. Butterfly Valves:
   a. Valves 2-1/2" and larger shall be wafer type body, 200 CWP, conforming to ASTM A-126 Class B cast iron, EPDM cartridge liner, A1. Bronze disc, 416 stainless steel stem. Sizes up to 6" - lever operated, 8" and up - gear operated.
   b. Recommended Valves:
   NIBCO #WD-2000 (Wafer Design)
   NIBCO #LS-2000 (Lug Pattern)
   Milwaukee Valve #CW-223-E (Wafer Design)
   Milwaukee Valve #CL-223-E (Lug Pattern)
   Hammond 6111 (Wafer Design)
   Hammond 6211 (Lug Pattern)

2.7 VALVE TAGS AND SCHEDULE:

A. Tag each valve with 1" diameter heavy brass tags secured to valve with brass hook. Prepare schedule giving the number of each valve, its service and general location.

2.8 PETE'S PLUGS:

A. Pete's Plugs shall be installed in the following locations and where indicated on contract documents:
   1. Inlet and discharge of boilers
   2. Across pumps
   3. Across control valves

B. Pete's Plugs shall consist of a 1/4" MPT fitting to receive either a temperature or pressure probe 1/8" outside diameter. Fittings shall be solid brass with two (2) valve cores of Nordel maximum 275^{o} F at 500 psi, fitted with a color coded and marked cap with gasket.

C. Upon completion of testing and balancing, present to the Owner one (1) Series 1500 test kit consisting of 0-100 psi, 0-230' of water pressure gauge with No. 500 gauge adapter attached, a 25-125^{o} F and a 0-220^{o} F pocket testing thermometer, a No. 500 gauge adapter and a protective carrying case.

2.9 PIPE SERVICE MARKING:

A. Pipes shall be identified as to their service after application of insulation and/or final painting, by color code banding and stenciling. Marking shall indicate pipe content and direction of fluid flow to fully comply with requirements of schedule for the identification of piping system ANSI-A13.1 including the following minimum requirements:
   1. Markers shall be stenciled in positions visible to personnel. Marking shall conform to pipe service identification (abbreviations) as noted on the contract documents.
   2. Paint pipe content banding, legend and flow direction marker at each valve, at every point of pipe entry and exit where a line goes through a wall, on each riser and tee joint and at 50' intervals on long continuous runs of pipe. Arrows (flow direction markers) shall point away from content marking and in direction of flow. If flow can be in both directions, apply double-headed arrows.
   3. In lieu of stenciling, semi-rigid plastic identification markers equal to SETMARK Pipe Markers as manufactured by Seton Name Plate Corporation. Equivalent marker as manufactured by MSI, Kolbi, or Brady will be acceptable. Each such marker shall be in full compliance with other requirements of the contract documents.

2.10 THERMOMETER:

A. Furnish and install thermometers where shown on the contract documents and where required. Thermometer shall be manufactured by Palmer, Weiss and be equal to Taylor #11ET510 with separable socket with extension neck for insulation. Range of thermometer shall be as required for location installed. Sockets and bulbs shall be long enough for bulbs to be immersed completely in liquid or air stream. Locate thermometers to provide convenience in reading from floor level.
   1. Provide thermometers in the following locations in piping systems and where indicated on the contract documents:
      a. Inlet and discharge of boilers,

2.11 PRESSURE GAUGES:

A. Furnish and install pressure gauges shown on contract documents, as listed below and where required. Ashcroft Duragauges #1279, U. S. Gauges #1670 or Weiss.

B. Gauges 4-1/2" diameter, 270° angle, dial calibration for pressure range, or for vacuum and pressure ranges as noted on the contract documents.

C. Install gauges accessible for readings. Install a needle valve in the connection to each pressure gauge and pressure stat.

D. Provide pressure gauges in the following locations and where indicated on contract documents:
   1. Across pumps

2.12 VIBRATION ISOLATORS:

A. Provide vibration eliminators and isolation equipment as manufactured by Mason Industries, Peabody Noise Control, Consolidated Kinetics Corporation or Korfund Dynamics Corporation for motors, pumps, air compressors, etc., as indicated on the contract documents or as required.

B. Make provisions in the installation of work so that noises or vibrations will not be transmitted through foundations, walls, columns, ducts, piping, etc., so as to be objectionable and shall be subject to review. Equipment shall be selected and installed with this in view. If equipment provided exceeds reasonable requirements as to quietness or vibration for its type and use when operating under continuous demand, it shall be altered or replaced without additional costs.

C. The isolation and vibration eliminator equipment manufacturer shall be totally responsible for the selection of the proper units for their loadings, quantities, etc., and he shall guarantee that each installation and its application shall have a vibration efficiency of 90% or greater. As a minimum, provide types of vibration eliminators as indicated on the contract documents.

D. Floor Mountings:
   1. Type A Double Deflection Neoprene Mountings: Double deflection neoprene mountings shall have a minimum static deflection of 0.35". Metal surfaces shall be neoprene covered to avoid corrosion and have friction pads both top and bottom so they need not be bolted to the floor. Bolt holes shall be provided for these areas where bolting is required. On equipment such as small vent sets and close coupled pumps, steel rails shall be used above the mountings to compensate for the overhang. Mounting equal to Mason Industries Type ND.
   2. Type B Spring Mountings: Free standing steel springs with neoprene acoustical pads between isolator base plate and supporting surface. Isolators to have leveling bolts. Spring diameter-minimum .8 of spring operating height. Minimum additional spring travel before going solid-50% of rated deflection. Mounting equal to Mason Industries, Type SLF.
   3. Type C Spring Mounting with Vertical Limit Stops: Spring characteristics similar to Type B except with limit stops for wind loading or for maintaining constant elevation if water weight is removed from equipment. Limit stops to be out of contact during normal operation. Mounting equal to Mason Industries Type SLR.

E. Hangers:
   1. Type D Neoprene and Spring: Combination spring and double defection neoprene element in series. Spring characteristics equal to Type B. Spring diameter and hanger box lower hole large enough to permit the hanger rod to swing through a 30° arc before contacting the box. Submittals shall include scale drawings of hanger showing 30° capability. Hanger equal to Mason Industries Type 30N.

F. Bases and Supports:
   1. Type G Wide Flange or Channel Rails: Steel support members tailored to cradle the equipment with built-in isolator mounting brackets to minimize equipment mounting height. Minimum beam height 1/12 of rail length but not less than 4". Rails equal to Mason Industries Type ICS.
   2. Type H Wide Flange or Channel Base: Integral structural steel base tailored to accommodate the equipment, including the motor slide base, with isolator mounting brackets to minimize operating height. Minimum beam height 10% of the longest base dimension but not less than 6". Base equal to Mason Industries Type WF.

G. Flexible Pipe Connectors:
   1. Type K Flexible Pipe Connectors: Flexible EPDM connectors shall be manufactured of multiple plys of frictioned nylon tire cord with an EPDM cover and liner. No steel wire or rings shall be used as internal pressure reinforcement. Straight connectors shall have two (2) spheres with a centered molded-in external ductile iron ring to maintain the two (2) spherical shapes. 2" and smaller sizes may have threaded ends. Floating flanges shall have a recess to lock the bead wire in the raised face flanges. Tapered twin sphere connectors as described above shall be used where line size changes are required in straight piping runs.
      a. Flanged equipment shall be directly connected to neoprene elbows in the size range 2-1/2" through 12", if the piping makes a 90° turn and flanges are equal sizes. Long radius reducing EPDM elbows shall be used in place of steel or cast iron elbows at pump connections.
      b. Twin sphere connectors shall be properly extended as recommended by the manufacturer to prevent additional elongation under pressure. Joints shall be designed for maximum elongation under pressure as follows:

PIPE SIZE	PRESSURE	ELONGATION
1 ½" to 2 ½"	250 psi	½"
3" to 8"	250 psi	¾"
10" and 12"	175 psi	7/8"

1) When the pressure would cause the connector to extend beyond it's rated elongation, control rods shall be employed using 1/2" thick bridge-bearing neoprene washer bushings designed for a maximum loading of 1,000 psi.

c. Twin sphere connectors shall have a minimum rating of 250 psi at 170° F and 165 psi at 250° F. Elbows and reducing twin spheres shall have a minimum pressure rating of 220 psi at 170° and 145 psi at 220° F. Neoprene materials shall be limited to 220° F. Certified safety factors shall be a nominal 4 to 1 with a minimum acceptable test result of 3.6 to 1. Tests shall cover burst, flange leakage, extension without control rods and flange retention at 50% of burst pressure without control rods.

d. Submittals shall include two (2) test reports by independent consultants showing minimum reduction of 20 dB in vibration accelerations and 10 dB in sound pressure levels at typical blade passage frequencies.

e. Control rods shall be type ACR as manufactured by Mason Industries or approved equal.

2. Type L Braided Hose: Flexible stainless steel hose and braided cover with carbon steel fittings. 2-1/2" pipe size and smaller male nipples. 3" pipe size and larger 150 pound ASA flanges. Install horizontally wherever possible on the equipment side of shutoff valves. Hose connection equal to Mason industries Type BSS.

Use length as follows:

Pipe Size up to and Including	Overall Length
2-1/2"	12"
3"	18"
6"	24"
8" and Over	36"

H. Piping:

1. Type P Piping Anchor and Guide Isolators: Acoustical pipe anchor and guide isolators consisting of telescopic arrangement of two size steel tubing separated by a maximum of 1/2" thickness of heavy duty neoprene and duct or neoprene isolation material. Vertical restraints by similar method to prevent vertical travel in either direction. Allowable loads on the isolation material not to exceed 500 psi with a balance design f**or** equal resistance in **any** direction. Isolators equal to Mason Industries Type ADA.

2. Piping Isolation: Isolate piping connectors to isolated mechanical equipment within the confines of the Mechanical Equipment Room but not for less than 50'. Isolator types will be as follows:
   a. Floor Mounted Type C
   b. Ceiling suspended Type E (first three (3) supports) and Type D thereafter, spring deflections first three (3) supports - equal to connected isolated equipment but not less than .75". Balance of supports .75" deflection.
3. Riser Isolation: Suspended or support HVAC risers by Type D hangers or C mountings and anchor guide risers with Type P isolators, as indicated on riser drawings or as required. Minimum spring deflections of .75" except in those expansion locations where additional deflection is required to limit deflection or load transfer to plus or minus 25% of initial stress.

I. Isolation Schedule:

	Basement or Slab on Grade		Upper Floors	
Equipment	Spec.	Min.	Spec.	Min.
	Type	Static Deflec	Type	Static Deflec
Pumps				
Close Coupled thru 5HP	A-K	0.35	B--K	0.75
7-1/2HP & over	B-K	0.75	B-J-K	1.5
Base-mounted thru 60 HP	B-K	0.75	B-J-K	1.5

PART 3 – EXECUTION

3.1 PIPING INSTALLATION:

A. Clearances: Give careful consideration to clearances under beams, joists, over windows, to provide maximum headroom and the locations of lines and type of fittings used to obtain these clearances.

B. Ascertain from the contract documents the heights of suspended ceilings and the size of shafts in which piping is to be concealed and the location and size of structural members in and adjacent to pipe shafts.

C. Coordinate the piping, ductwork, and lighting work with one another and with other equipment. Where insufficient room is provided for piping above suspended ceilings or in vertical shafts, obtain clarification in writing before work is installed.

D. Cutting: Cut pipe accurately to measurements established at the building, work into place without springing or forcing, and properly secure to structure in an approved manner.

E. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted, unless approved. Ream piping to remove burrs and install so as to permit free expansion and contraction without causing damage. Make changes in direction with fittings and changes in main sizes through eccentric reducing fittings.

F. Piping at tanks and pumps shall be supported independently so that no weight will be supported by the equipment.

G. Joints, Valves, Couplings: Provide valves, couplings, etc., at runouts to equipment, devices and other points requiring same to provide flexible piping systems.

H. Provide shutoff valves and unions or flanges at each branch or in supply and return to each item of equipment. Valves and unions or flanges shall be suitably located to isolate each unit, branch circuit, or section of piping to facilitate maintenance and for removal of equipment and apparatus.

I. Dielectric couplings or unions shall be provided at the junction of two (2) pipes or of pipe to equipment of two (2) different metals to eliminate electrolytic action.

J. Piping conveying water shall be installed with a pitch, in the direction of flow of not less than 1" in 40'. In cases where branches are installed and connected into vertical risers, the branches shall pitch back to the respective risers. Horizontal branches from mains shall be taken off the top of respective risers. Horizontal branches from mains shall be taken off the top of the mains by means of 90° ells. It shall be possible to drain separately each part of the system; drain valves shall be provided in the systems wherever required for this purpose.

K. Provide air vents in high points in the system to permit proper filling and venting.

L. Before piping is installed, it shall be opened and pounded to remove foreign matter present. Ends of piping and tubing shall be sealed with caps or plugs during construction. Paper or rags will not be permitted. After installation and before final connections are made, piping systems shall be flushed with a material that is not injurious to either the pipe or material to be conveyed by the pipe.

M. Threaded pipe shall be cut square and full threaded and shall be made with approved pipe thread compound, applied to the wall threads only, and shall be made up so that no more than two (2) threads will be exposed.

3.2 PIPE TESTS:

A. Piping shall be tested with hydrostatic pressure or other means, as directed, and shall be proved tight, as hereinafter specified before it is enclosed or covered, and before insulation is applied. The piping shall be tested in sections.

B. During these tests, pressure shall not be transferred to a tank, shell or other manufacturing or process equipment that may be connected to the line under test. Full physical disconnection shall be made at or near the final connection to the equipment and the line capped or plugged.

C. Piping shall be tested with pressure equal to 1-1/2 times the normal working pressure, but not less than 100 pounds per square inch, except where specified otherwise. The duration of pressure tests shall be sufficient to permit observation of joints (minimum twelve (12) hours). Submit reports for review.

D. Pinhole leaks which develop in welded joints shall be chipped out and rewelded. Caulking will not be permitted. A general sweating at joints shall be cause of rejection. It shall be completely removed and rewelded.

E. Threaded joints which develop leaks shall be rejected. Either the thread, fitting, or both shall be removed and replaced. No caulking will be permitted.

3.3 CLEAN-UP:

A. Exposed metal surfaces shall be free from grease, dirt, and other foreign material. Chrome plated fittings, piping, and trimmings shall be polished upon completion.

B. Fixtures shall be properly protected from damage during the construction period.

C. Debris resulting from execution of this contract, surplus and discarded material, shall be removed from the premises within three (3) days after the accumulation. Remove plaster from piping, radiation, etc.

D. On completion of the work, tools, surplus, and waste materials shall be removed and the work left in a clean and perfect manner. During work progress, remove debris and excess materials as directed by the job superintendent.

3.4 TEMPERATURE CONTROL WIRING:

A. Provide all conduit, wiring, accessories and wiring connections required for required Temperature Control (TC) installation, unless specifically shown on the Electrical Drawings.

B. All TC wiring materials and installation methods shall comply with equipment manufacturer recommendations.

C. Class 2 wiring (24VAC or less) shall be installed in conduit unless otherwise specified. Conduit is not required for Class 2 wiring in concealed accessible locations. Class 2 wiring not installed in conduit shall be supported every 5' from the building structure utilizing metal hangers designed for this application. Wiring shall be installed parallel to the building structural lines. All wiring shall be installed in accordance with local code requirements

D. Provide complete testing for all cables used under this Contract. Provide all equipment, tools, and personnel as necessary to conduct these tests.

3.5 ELECTRICAL MOTORS, STARTERS, AND WIRING:

A. Apparatus supplied shall be complete with electric motors, starting equipment, remote control equipment, speed controls, and thermostat, where required.

B. Alignment of motors, factory coupled or mounted, and motors field coupled and mounted shall be rechecked after connections have been made and after 48 hours of operation in designed service.

C. Verify the voltage characteristics of each motor with the contract documents and/or service available. Provide motors, starting equipment, controls, etc. that match the electrical characteristics available in the area of installation.

D. Provide for each polyphase motor a combination magnetic motor starter with three (3) thermal overloads, two (2) auxiliary contacts, pilot light, and H.O.A. switch. Starters shall be of one (1) manufacturer and as manufactured by Allen Bradley, Square D, Westinghouse or General Electric.

E. Manual starters for motors up to and including 1/2 HP shall be equal to General Electric Company CR-1061 or Square D.

F. Manual starters for motors over 1/2 HP shall be equal to General Electric Company CR-1062.

G. Manual starters and remote control equipment located in finished areas shall be recess mounted and provided with stainless steel coverplates. Remote pushbutton stations shall be miniature type.

3.6 SCAFFOLDING:

A. Furnish necessary scaffolding, staging, or cribbing required for the completion of the work. Such scaffoldings, etc. shall be removed from the premises when its use is no longer required on the job.

3.7 FINAL COMPLETION:

A. Clean equipment, restore damaged materials, remove grease, oil, chemicals, paint spots, and/or stains, and generally leave the work in new condition.

B. Retouch and/or repaint factory painted prime and/or finish coats where scratched or damaged. Whenever retouching will not be satisfactory, complete repainting of equipment until the desired appearance is obtained may be required.

C. On completion of work, remove from the site tools, equipment, surplus materials, and rubbish pertaining to operations for removal and disposition at no additional cost.

3.8 WARRANTY AND MAINTENANCE:

A. During the warranty period, the entire system shall be adjusted to maintain the operating conditions specified in the contract documents. Equipment furnished shall be warranted in writing for one (1) year after Substantial Completion has been issued (unless noted otherwise). Warranty shall include equipment, system operation, workmanship and materials.
   1. Equipment or parts proving defective shall be replaced without cost.
   2. Visit the building at the 6-month and 11-month warranty period, and thoroughly inspect the complete system and make repairs or heating and cooling adjustments to obtain maximum operating economy. At the same time, instruct the maintenance supervisor in its care and operation.

B. Five (5) copies of the warranty shall be submitted for review. In addition to the above, perform two (2) regular service inspections, one (1) at the beginning of the heating season and one (1) at the beginning of the cooling season.
   1. During each inspection, provide labor and materials to check, clean, calibrate and lubricate components requiring same.
   2. Defective parts shall be replaced, including labor to remove and reinstall with no additional cost.
   3. When required, emergency or overtime service shall be provided without additional cost.

C. Inspection reports shall be countersigned and filed after each inspection. Reports shall list every modification made during inspections.

3.9 OWNER INSTRUCTION AND SYSTEM DEMONSTRATION:

A. Verify completed systems and arrange date agreeable with Owner for a demonstration of completed systems in the project. Demonstrate on a one (1) time basis, at time of completion, to the Owner, the essential features of the mechanical applied systems and their compliance with the contract documents. Show Owner contract documents and relation to function of equipment and corresponding location in the project structure.

B. Show by start/stop operation, the manner of control, resetting of protective devices, and the replacement of fuses.

C. Demonstrate temperature control systems and devices, including sequence of controls.

D. Instruct Owner in operation and maintenance of equipment and controls.

E. Video tape the instruction/demonstration session, label this tape as such and submit three (3) copies for review.

F. On completion of the work, furnish and deliver special tools that may be required for the proper servicing of equipment furnished for the project.

3.10 OPERATION AND MAINTENANCE MANUALS:

A. Compile and submit, at completion of the work, two (2) neatly bound booklets containing operation and maintenance instructions for equipment and systems.

B. The cover of each manual shall state the section of work covered (i.e: "plumbing," "heating, ventilating, and air conditioning," "air balance," etc.).

C. Each manual shall contain the following information:
   1. Complete written operating and maintenance instructions for each equipment item.
   2. Complete parts list for each equipment item.
   3. Duplicate valve tag list.
   4. Blueprint, shop, and record documents.
   5. Certified equipment drawings and/or catalog data (clearly marked for equipment furnished).
   6. Emergency operating instructions and/or list of service organizations (including address and telephone numbers) capable of rendering emergency service on 24-hour call.
   7. Training session video tape.
   8. Copy of performance warranty.
   9. Copy of maintenance warranty.
   10. Copies of manufacturers' warranties for equipment.
   11. Temperature control record documents.

END OF SECTION 15050

SECTION 15250
INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Conform to all applicable provisions of Section 15050.

B. Refer to Section 15880 for internal duct lining.

1.2 DESCRIPTION OF WORK:

A. Insulate the following:
   1. Hot water heating supply and return piping.
   2. Repair of existing hot water heating piping insulation damaged during pipe modifications.

1.3 QUALITY ASSURANCE:

A. Work and materials shall be in compliance with local and federal code requirements.

B. Work and materials shall be in compliance with National Fire Protection Association Standard No. 90A.

C. Insulating materials shall be installed in accordance with the manufacturer's recommendations as to the method of application and for the proper type of adhesives to be used, except where contract documents specifically state other directions.

1.4 SHOP DRAWING SUBMITTAL:

A. Submittals shall be required for the following items, and for additional items where required for a complete and operational system:
   1. Hot Water Heating Piping Insulation Materials.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Insulation shall be as manufactured by Johns Manville, Owens-Corning, Knauf or Manson.

B. Mastics, sealers, cements and other sundry materials shall be the product of a named insulation manufacturer or Chicago Mastic, Insulcoustic or Benjamin-Foster.

2.2 MATERIALS:

A. Material shall have composite flame-spread rating of not over 25 and a smoke-development rating of not over 50 in accordance with Interim Federal Standard No. 00136A (Comm.-NSB) including coverings, mastics, and adhesives.

B. Pastes, sizing, and cements used in connection with insulation work shall contain approved vermin and rodent repelling, mold resistant ingredients, and shall be certified. Materials shall be non-flammable in the wet state, incombustible or fire resistant in the dry state and shall be U.L. approved. Thickness of coatings, sealers, and adhesives specified herein shall serve as minimum requirements. Where manufacturer's recommendations exceed specified thickness, comply with manufacturer's recommendations.

2.3 PIPING INSULATION (EXPOSED AND CONCEALED):

A. Interior piping insulation for systems with operating temperatures up to 650°F shall be Johns Manville Micro-Lok 650 AP fiberglass insulation (or approved equal). Pipe insulation to be furnished with vapor barrier jacket and shall be installed with continuous, unbroken vapor seal. Insulation cover to be sealed with adhesive only and vapor seal tape applied over joints.

B. Fittings, valves, roof sumps, and flanges shall be insulated with Johns Manville Zeston PVC fitting covers and Hi-Lo Temp Insulation (or approved equal). Two (2) layers of factory precut Hi-Lo Temp Insulation inserts shall be applied to fittings with the first layer wrapped with fiberglass yarn.

C. Piping insulation for the following services shall be insulated to the minimum thickness listed below:

Piping System Type	Pipe Sizes	Insulation Thickness
Hot Water Heating Supply and Return	2" & less	1.5"
	2 ½" & over	2.0"

PART 3 – EXECUTION

3.1 INSTALLATION:

A. On cold surfaces where a vapor barrier must be maintained, insulation shall be applied with a continuous, unbroken moisture and vapor seal. Hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation.

B. Surface finishes shall be extended in such a manner as to protect raw edges, ends, and surfaces of insulation.

C. Pipe or duct insulation shall be continuous through walls, ceiling or floor openings, or sleeves, except where firestop or firesafing materials are required.

D. No pipe covering or insulation materials shall be applied to piping, ductwork, or item of equipment until after tests have been completed and the work is proven sound and free from defects.

E. Pipes, fittings, equipment, ductwork, etc., which are to be insulated shall be thoroughly dry and free from oil or other foreign matter before insulation is applied.

F. Adhesives shall be applied as specified in continuous bands for complete coverage. The application of adhesives in daubs is not permitted.

G. Equipment and work by other trades shall be protected during insulation installation.

H. Entire insulation installation shall comply with manufacturer's recommendations. If there is a conflict between these contract documents and the manufacturer's recommendations, follow the more stringent procedure.

I. Existing insulation which may have been damaged during installation of new work shall be repaired and replaced as required. Thickness and density of new insulation shall match the existing.

3.2 PIPE INSULATION:

A. Pipe insulation shall be applied with adjoining sections firmly butted together and sealed with lap cement, the longitudinal seam of the vapor barrier lap cemented with Foster No. 85-75. End joints shall be sealed with minimum 3" wide factory furnished vapor barrier strips applied with Foster No. 85-75 lap cement.

B. Pipe fittings for hot systems shall be insulated with factory precut and formed PVC insulated fitting covers. The ends of the Hi-Lo Temp insulation insert shall be tucked snugly into the throat of the fitting and the edges adjacent to the pipe covering tufted and tucked in, fully insulating the pipe fitting. The Zeston 25/50 PVC pipe cover shall then be applied and shall be secured by tack fastening banding or taping the ends to the adjacent pipe covering.

C. Pipe fittings for cold systems shall be insulated the same as described for hot systems above except as follows: A vapor barrier mastic compatible with the 25/50 PVC shall be applied around the edges of the adjoining pipe insulation and on the fitting cover throat overlap seam. The Zeston 25/50 PVC cover is then applied and shall be secured with pressure sensitive Z-tape along the circumferential edges. The tape shall extend over the adjacent pipe insulation and have an overlap on itself at least 2" on the downward side.

D. Insulation shall pass uninterrupted through pipe hangers. Inserts shall be installed at hangers and shall consist of rigid pipe insulation of thickness equal to the adjoining insulation. Inserts shall be provided with vapor barrier when used on cold systems. Insulation inserts shall not be less than the following lengths:

Pipe Size	Length
½″ – 2 ½″	10″
3″ – 6″	12″

E. Insulated piping resting on pipe support shall be provided with No. 18 gauge galvanized steel Rib-Lok pipe covering protection shields equal to those manufactured by Grinnell or Midwest Hanger Supply Company. Pipe hangers at point of support for such piping shall be of ample size to enclose the pipe covering without notching.

END OF SECTION 15250

DIVISION 15300

FIRE PROTECTION/SPRINKLER SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Conform to all applicable provisions of Section 15050.

1.2 DESCRIPTION OF WORK:

A. The work of this section consists of providing materials, accessories, equipment, tools, cartage, and transportation and performing services and labor required for the automatic sprinkler work for the proposed construction as indicated on applicable contract documents.

B. The work of this Section includes, but is not necessarily limited to, the following:
   1. Arrange for, obtain, and bear the cost of necessary permits, bonds, and fees for the automatic sprinkler work.
   2. Remove the existing sprinkler heads and associated branch sprinkler piping as indicated.
   3. Connect and extend new sprinkler branch piping from the existing sprinkler mains to new sprinkler head locations. .
   4. Provide new sprinkler heads in the locations indicated.
   5. Furnish and install new sprinkler piping complete with, overhead piping, pipe supports, and sprinkler heads.
   6. Do the testing of piping work and necessary cleaning of the fire protection work.
   7. Furnish the shop drawings and certificates of inspection.
   8. Periodically remove from the job site rubbish or debris resulting from the fire protection work.

C. Provide necessary hydraulic calculations and drawings indicating pipe sizes, etc. as per latest NFPA Code requirements.

D. The sprinkler system shall be designed to deliver a density of .10 gpm over the most remote 1500 sq.ft., with allowance for 100 gpm outside hose stream. Calculations shall be in accordance with the latest NFPA #13 chapter for light hazard.

1.3 WORK NOT INCLUDED:

A. Certain items not included in this Division are as follows:
   1. Finish painting work.

1.4 EXAMINATION OF SITE:

A. Before submitting their proposals for the automatic sprinkler work, the bidders shall visit and carefully examine the site of the work to appraise and familiarize themselves with existing conditions such as locations of existing water main, features affecting working conditions, transportation, and storage facilities. Bidders shall give due consideration to same in preparing their proposals, as no exceptions will be considered after awarding the contract, nor will the **contractor** be entitled to extra compensation for work resulting from his failure to verify conditions at the site.

1.5 DRAWINGS:

A. The contract documents show the schematic layouts for their respective systems. It is not intended that the contract documents show and locate the exact dimension, pipe, fitting, valve, piece of apparatus, etc. The contract documents shall be followed as closely as circumstances will permit. Be responsible for the proper installation of his work in accordance with the intent and meaning of the contract documents, and standard practice.

B. The architectural, electrical, plumbing, and mechanical drawings concerning this project shall be considered as being part of the automatic sprinkler work set. The bidders (and contractor during the job) shall direct the attention of the Architect or the Project Manager to discrepancies, if such occur on drawings or between contract documents or between drawings and actual field conditions, for a decision in the matter.

C. The contract documents show the schematic layout for sprinkler head locations. Center sprinkler heads in the lay-in ceiling tile or as noted on the accompanying contract documents.

1.6 COMPLIANCE WITH CODES:

A. Work shall be done in strict accordance with the requirements of the latest standards of the National Fire Protection Association, Pamphlet #13 and is subject to the inspection and approval of the state ISO and state and local fire departments and authorities having jurisdiction.

B. Work shall also be done in strict accordance with rules, regulations, laws, and ordinances of local, city, country, federal and state authorities, and the utility companies serving the area in which the installation is to be made.

C. If there is a discrepancy between the codes and regulations having jurisdiction over the installation and the contract documents, the codes and regulations shall determine method of equipment used.

D. If the drawings and specifications do not comply with all codes, the fire protection contractor shall submit, with his proposal, the extra price required to make the sprinkler system shown on the drawings comply with the codes.

E. All changes in the sprinkler work made after the letting of the contract in order to comply with the applicable codes or requirements of the enforcing inspectors shall be made without additional cost to the Owner.

1.7 SHOP DRAWINGS AND DATA:

A. Prepare drawings of the automatic sprinkler work showing the arrangement of automatic sprinkler piping for equipment, spacing of sprinkler heads, size and elevations of lines and details necessary for the conduct of work. The sprinkler system shall be designed using hydraulically sized pipe based on the applicable occupancy hazard as stated in the latest edition of the NFPA code and as required by local authorities having jurisdiction. Provide hydraulic calculations on entire system as per NFPA Code requirements. Shop drawings shall include the following as a minimum:

1. Reflective ceiling plans with light fixtures and HVAC diffusers.

B. Before commencing work or providing materials at the job site for this project, submit for review catalog cuts and descriptive matter regarding materials and equipment which he intends to furnish and install. Shop drawings shall be complete in every detail; partial lists of manufacturer's shop drawings and detailed data will not be acceptable.

C. The submittals shall bear the "Stamp of Approval" of the contractor as evidence that the drawings and materials have been checked and considered satisfactory to the contractor. Drawings and materials submitted which include variations and deviations from the requirements of the contract documents shall include specific mention of such variation in order that, if acceptable, action may be taken for adjustment and proper field installation.

1.8 SHOP DRAWINGS SUBMITTALS:

A. Six (6) sets of the final detailed working drawings to the authority having jurisdiction with the request to return five (5) approved copies. They shall retain one (1) set of drawings for their file.

B. In the event additional clarifying details are required by the authority having jurisdiction, the details shall be prepared, and approval of same secured by the contractor at his expense.

C. Provide approval letter from authority having jurisdiction for review.

D. Submittals shall be required for the following items, and for additional items where required for a complete and operational system:
   1. Hydraulic Calculations.
   2. Fire Protection piping plans indicating pipe size, location and sprinkler heads.
   3. Piping Materials.
   4. Pipe Joints.
   5. Sprinkler Heads.
   6. Sprinkler Cabinet.

1.9 COOPERATION:

A. It shall be the responsibility of the sprinkler contractor to familiarize himself with the general construction, plumbing, heating, air conditioning, electrical, and refrigeration work in order to eliminate the possibility of interference of the sprinkler contractor's work with other contractors' work.

B. No extras will be allowed to the sprinkler contractor for reworking and reinstalling pipe or equipment in order to make space available for other work.

C. In the case of an interference occurring during construction, the Architect shall determine which of the work shall be changed and the change shall be made without cost.

PART 2 – PRODUCTS

2.1 WATER SERVICE:

A. Connect and extend new sprinkler branch piping from the existing sprinkler mains to new sprinkler head locations, etc., as required for a complete approved installation.

2.2 MATERIALS:

A. The proposal submitted shall include materials and equipment as specified or shown on the contract documents.

B. Materials furnished shall be new and shall conform to the latest standard practices of recognized manufacturers of such items. Materials and equipment shall bear the Underwriters' Laboratories, Inc. label where applicable.

2.3 PIPING:

A. Pipe shall be Schedule 10 for main piping and Schedule 40, Schedule 10, or thin wall for branch piping, designed for 175 pounds working pressure, conforming to ANSI B36-10 and manufactured in the United States. The manufacturer's name and branch shall be on each length of pipe.

B. Fittings shall be new, 125 pounds cast iron, screwed, FIT®, or slip-locked, conforming to ANSI B16.4, manufactured in the Unites States and specifically approved for use in automatic sprinkler systems.

C. Screwed pipe shall have threads cut to American Standard Pipe Thread and shall be clean and free from burrs and fins. Pipe shall be reamed and cleaned internally after cutting. Thread lubricant, white lead in oil, or approved equal, shall be applied to male threads immediately prior to assembly. Completed joints shall be wiped clean of excess lubricant.

D. Sprinkler systems couplings shall be Victaulic “FireLock” rigid couplings in lieu of threaded piping systems for sizes up to 12”. Couplings shall be UL FM approved to 365 psi at ambient temperatures, and for schedule10 and schedule 40 piping systems. Couplings shall have ductile iron body, Grade EPDM Type A molded synthetic gasket, and steel nuts and bolts. Couplings shall be installed in accordance with the latest Victaulic recommendations and installation instructions, and NFPA 13 requirements.

E. Piping will be installed in a uniform manner, direct as possible. Horizontal piping shall be run at right angles and shall not run diagonally across rooms or other piping and shall be carefully installed to provide proper slope. In general, piping shall be arranged to pitch back to the riser, pitched 1/4" in 10'-0". The pitch may be reduced only where necessary to clear obstructions. The piping shall be arranged with drain plugs or valves and plugs as required to provide means for drainage of trapped piping. Trapping of piping shall be avoided wherever possible.

F. Field welding and gas cutting shall not be employed for assembly of pipe and fittings of the fire protection work.

2.4 SPRINKLER HEADS:

A. Sprinkler heads in finished ceiling areas shall be of approved quick response extended coverage design with nominal 1/2" discharge orifice, semi -recessed type with chrome ring.
   1. Sprinkler heads located in suspended lay-in ceiling: Systems shall be centered in each respective tile.

B. Sprinkler heads shall be as manufactured by Globe, Grinnell, Viking, Reliable or Star Sprinkler Company will be accepted.

2.5 SPRINKLER CABINET:

A. Contractor shall provide and install one (1) sprinkler cabinet (wall mounted up 4'-0") as per National Fire Protection Association Pamphlet No. 13 with four (4) additional heads (each) of the types used on the job, together with necessary wrenches to make emergency changes of types of heads used.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Employ on the job a competent superintendent who shall be responsible for the progress and execution of the work. Workmanship shall be of high quality conforming to standard practice as stipulated by NFPA, ASTM, and ANSI recommendations by skilled workmen during their regular working hours.

B. Piping Installation:
   1. Install piping as required for a complete and operational system. Provide accessories as required based on actual field pipe routing and system requirements.
   2. Piping shall be brought to equipment connections in such a manner so as to prevent the possibility of loads or stresses being applied to the connections.
   3. No cutting of, or welding of, attachments to structural members shall be done without prior written approval.

C. Inspection and Tests:
   1. Conduct and bear the cost of necessary tests of the fire protection work, furnishing labor, power and equipment. Piping shall be tested with water.
   2. The automatic sprinkler piping shall be tested under a hydrostatic pressure of not less than 200 psig for a duration of not less than two (2) hours.
   3. The piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of air. The control valves of existing risers shall be closed during pressure testing of the new connection to the main. Joints shall be proven tight or acceptable by the tests. Defective work or materials shall be corrected or replaced in an approved manner. If necessary, piping shall be dismantled and reassembled with the use of new pipe or fittings as no caulking or makeshift method of temporary repair of defective work will be permitted. Tests shall be repeated until the particular line or system receives the approval.
   4. Acceptance of the automatic sprinkler work shall be based upon the inspection and tests of the completed installation by the authority having jurisdiction.
   5. Be responsible during the installation and testing periods for the automatic sprinkler work, for damage to the work of others, to the building, and property/materials of others caused by leaks in automatic sprinkler equipment, unplugged or disconnected pipes or fittings, and shall pay for necessary replacement or repair of work or items so damaged.

END OF SECTION 15300

SECTION 15540

HVAC PUMPS AND SPECIALTIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Conform to applicable provisions of Section 15050.

1.2 DESCRIPTION OF WORK:

A. Work Included: This Section of work includes the furnishing and installing of hydronic pumps,., required for a complete operating hot water heating system.

1.3 QUALITY ASSURANCE:

A. Equipment or components of this contract document section shall meet or exceed the requirements and quality of the items as noted on the contract documents.

B. Units shall be UL, NEMA, C.S.A. or E.T.L. listed.

C. Unit shall be constructed in compliance with applicable ANSI, IEC, and NEC code requirements.

D. Provide two (2) year warranty on pump drives including parts and labor necessary to repair or replace the same.

1.4 PRODUCT HANDLING:

A. Protection: Use every means necessary to protect equipment before, during, and after installation.

B. Replacement and Repair: Scratched, dented, and otherwise damaged units shall be repaired or replaced as directed.

1.5 SHOP DRAWING SUBMITTALS:

A. Submittals shall be required for the following items, and for additional items where required for a complete and operational system:
   1. Circulating Pumps

PART 2 – MATERIALS

2.1 CIRCULATING PUMPS:

A. Provide new circulating pumps for chilled water and hot water heating systems as indicated on the contract documents. Pumps shall be as manufactured by Bell & Gossett, Taco, Aurora, Dunham-Bush or Armstrong. Pumps shall be of sizes and capacities as indicated in the Equipment Schedule on contract documents.

B. Provide new pump start-up service (factory supervised) for the purpose of pump alignment, lubrication, voltage, and amperage readings. Proper electrical connections, pumps balance, discharge and suction gauge readings, adjustment of head, if required. A copy of the start-up report shall be made and submitted for review.

C. In Line Booster Pumps:
   1. The pumps shall be of the horizontal, oil lubricated type, specifically designed and guaranteed for quiet operation. Suitable for 125 lbs. of working pressure.
   2. The pumps shall have a ground and polished steel shaft with a hardened integral thrust collar. The shaft shall be supported by two horizontal sleeve bearings designed to circulate oil. The pumps are to be equipped with a watertight seal to prevent leakage. Mechanical seal faces to be carbon on ceramic.

3. The motor shall be of the open, drip-proof sleeve bearing, quiet operating, rubber-mounted construction. The motor shall be non-overloading.

D. In-Line Circulating Pumps:
1. The pump shall be single stage, vertical split case design, in cast iron bronze fitted (or iron or bronze) construction. The pump internals shall be capable of being serviced without disturbing piping connections.
2. The impeller shall be of the enclosed type, hydraulically and dynamically balanced and keyed to the shaft and secured with a suitable locknut.
3. The pump shall employ a mechanical seal, with a carbon seal ring and ceramic seat. A shaft sleeve shall be furnished under the complete wetted area of the mechanical seal.
4. The bearing frame assembly of the pump shall be fitted with oil lubricated, bronze journal bearings and a hardened alloy steel shaft.
5. A flexible coupling, capable of absorbing torsional vibration, shall be employed between the pump and motor.
6. The motors through 2 HP shall be resilient mounted, equipped with oil lubricated journal bearings. The motors over 2 HP motor shall be rigid mounted, with ball bearings. The motor shall meet NEMA specifications.
7. The pump shall be factory tested, thoroughly cleaned, and painted with one coat of machinery enamel prior to shipment. A set of installation instructions shall be included with the pump at the time of shipment.

E. Base Mounted End Suction Pumps:
1. Pumps shall be base mounted, single stage, end suction design with true back pull-out, capable of being serviced without disturbing piping connections.
2. Pump volute shall be Class 30 cast iron with integrally-cast pedestal support. The impeller shall be cast bronze, enclosed type, dynamically balanced, keyed to the shaft and secured by a locking cap screw.
3. The liquid cavity shall be sealed off at the pump shaft by an internally-flushed mechanical seal with ceramic seal seat of at least 98% alumina oxide content, and carbon seal ring, suitable for continuous operation at 225° F. A replaceable bronze shaft sleeve shall completely cover the wetted area under the seal.
4. Pumps shall be rated for minimum of 175 psi working pressure. Casings shall have gauge ports at nozzles and vent and drain ports at top and bottom casing.
5. Pump bearing housing assembly shall have heavy duty regreaseable ball bearings, replaceable without disturbing piping connections and have foot support at coupling end.
6. Base plate shall be of structural steel or fabricated steel channel configuration fully enclosed at sides and ends, with securely welded cross members and fully open grouting area. A flexible type coupler, capable of absorbing torsional vibration, shall be employed between the pump and motor, and it shall be equipped with a suitable coupling guard as required. Level and grout each unit according to manufacturer's instructions.
7. The motor shall meet NEMA specifications and shall be the size, voltage, and enclosure called for on the contract documents. Pump and motor shall be factory aligned, and shall be realigned after installation. Motors for VFD systems shall be energy efficient type suitable for variable speed application.
8. Each pump shall be factory tested. It shall then be thoroughly cleaned and painted with at least one coat of high grade machinery enamel prior to shipment.

2.2 SUCTION DIFFUSERS:

A. Provide at each base mounted pump with a suction diffuser of size and type noted on the contract documents. Units shall consist of angle type body with inlet vanes and combination diffuser/strainer/orifice cylinder with 3/16" diameter openings for pump protection. A permanent magnet shall be located within the flow stream and shall be removable for cleaning. The orifice cylinder shall be equipped with a disposable fine mesh strainer, which shall be removed after system start-up. Orifice cylinder shall be designed to withstand pressure differential equal to pump shutoff head and shall have a free area equal to five times cross section area of pump suction opening. Vane length shall be no less than 2 1/2 times the pump connection diameter.

B. Suction diffusers shall be provided with adjustable support foot to carry weight of suction piping. Suction diffusers shall be as manufactured by Bell & Gossett, Wheatley, Aurora, Taco, Dunham-Bush or Armstrong.

2.3 TRIPLE DUTY VALVES:

A. Provide triple duty valves on the discharge side of water circulating pumps. Valves shall be designed to permit repacking under full line pressure and shall be installed to provide minimum clearance for the valve stems. Straight-through units shall be installed with valve stems in an upright position. Valves 1" through 8" shall be designed for 175 psig working pressure, 250° F. design operating temperature. Sizes shall be as indicated on the contract documents. Valves shall be as manufactured by Bell & Gossett, Wheatley, Taco, Dunham-Bush, Armstrong or Systecon.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Equipment Installation:
   1. Provide permanent placard attached to unit identifying unit number.
   2. Install base mounted pumps level on base.
   3. Install all field-installed options shipped loose with equipment per manufacturer's recommendations.
   4. Furnish and install triple duty valves on the discharge of pumps and furnish and install a line size shut-off valve on the suction side.
   5. Do not operate units for any purpose, temporary or permanent, until filters are in place, bearings lubricated and pump has been test run under observation.

B. Piping Installation:
   1. Make connections to unit and check for leaks.
   2. Install piping as required for a complete and operational system. Provide accessories as required based on actual field pipe routing and system requirements.
   3. Piping shall be brought to equipment connections in such a manner so as to prevent the possibility of loads or stresses being applied to the connections.
   4. Provide additional supports for in-line pumps such that no load is transmitted to the piping system. Support pump and motor per manufacturer's recommendations and maintain required service clearance.

C. Temperature Control Installation:
   1. Control wiring is to be in accordance with local, federal, state and national electric wiring codes.
   2. Unit is to be controlled by temperature control system. Coordinate installation of controls, sensors, thermometers, pressure gauges, etc. with temperature control contractor.

D. Manufacturer Start-up:
   1. Arrange and pay for tests and start-up fee required for installation of equipment.
   2. Equipment manufacturer shall furnish required control devices, panels, sensors, wiring diagrams, etc. for the installation. Manufacturer shall work with and assist in the initial equipment controls set up for a complete and operational system and to verify that required temperature controls points are communicating with the FMS system.
   3. Equipment manufacturer shall provide a factory trained service technician to completely check-out and start-up equipment, associated controls and accessories. Manufacturer's representative shall instruct the maintenance personnel in the care and operation of the equipment.
   4. Submit manufacturer's start-up report for review. As a minimum, start up report shall contain the following information:
      a. Electrical connections and terminals have been connected and are tight.
      b. Disposable strainer has been removed from suction diffuser.
      c. Temperature control points are communicating with FMS system.
      d. Maintenance personnel have been instructed in the care and operation of the equipment.
      e. Field supplied options shipped loose have been installed per manufacturer's recommendations.
      f. Remote start/stop and reset are functional.
      g. VFD is set for proper water flow rate.
      h. List all field set point values (i.e. system pressure set-points, triple duty valve setting, etc.).

END OF SECTION 15540

SECTION 15880

DUCTWORK AND ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Comply with applicable provisions of Section 15050.

1.2 DESCRIPTION OF WORK:

A. Furnish the labor, materials, equipment, appliances, services, and perform the operations in connection with the construction and installation of the work. Work to be as herein specified and as denoted on the accompanying drawings.

B. This section of the work includes the furnishing and installing of accessories and specialties incidental to the construction of the heating, ventilating, air conditioning systems.

1.3 QUALITY ASSURANCE:

A. Conflicts between ASHRAE and SMACNA duct construction recommendations shall submitted for review.

B. Comply with the enclosed specification in its entirety. If, on various walk-throughs and inspections, changes have been made without prior approval and the changes are not specified within, make the applicable changes to comply with this specification and the drawings.

1.4 SHOP DRAWING SUBMITTALS:

A. Submittals shall be required for the following items, and for additional items where required for a complete and operational system:
   1. Grilles

PART 2 – PRODUCTS

2.1 Grilles:

A. Round, square, and/or rectangular transfer air grilles with neck dimensions, capacity, and style shall be as scheduled or denoted on drawings. Grilles shall be of steel construction with baked off white enamel finish (unless otherwise noted), equipped with necessary baffles to eliminate drafts and provide proper air distribution.
   1. Coordinate type of each ceiling diffuser, grille and register with the ceiling system into which it is to be installed.
   2. Approved manufacturers of air diffusers and return air grilles include the following: Carnes, Nailor, Titus or Price.
   3. Transfer air grilles shall be constructed of steel, stainless steel or aluminum as specified on the drawings.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Transfer air grilles shall be installed substantially as indicated on the drawings. However, where conflicts occur with other trades, building structure, etc. make minor changes in duct locations without extra cost.

END OF SECTION 15880

SECTION 15950

TEMPERATURE CONTROLS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Conform to all applicable provisions of Section 15950.

1.2 DESCRIPTION OF WORK:

A. Make modifications to the existing Johnson Controls direct digital temperature control Facilities Management System (FMS) to control the new systems as herein specified, shown on drawings and as required to comply with required sequences of automatic control and Point List.
   1. Provide new graphics to match or the existing facility standards.
   2. Extend the communication network with necessary servers and controllers for new boiler pumps, building hot water heating pumps, and make modifications to the existing VAV air handling units and VAV boxes, etc.
   3. Provide all necessary Control devices, instruments, panels, dampers, valves, electronic actuators, instruments, etc.
   4. Provide all necessary Thermostats, temperature sensors, pressure sensors, control relays, current sensing relays, switches, alarms, etc.
   5. Provide all necessary Provide all transformers and low voltage wiring.
   6. Provide complete start-up, testing, and adjustment of the FMS and provide owner training of the system.
   7. Provide training of maintenance personnel.

1.3 MANUFACTURER:

A. The temperature control (TC) system shall be manufactured and installed by one of the following:
   1. Johnson Controls, Inc. (Metasys) as installed by the local branch office.

B. The temperature control contractor shall be a recognized national manufacturer, installer and service provider of the specified temperature controls. Distributors, manufacturer's representatives and wholesalers are not acceptable for this project.

1.4 QUALITY ASSURANCE:

A. Provide a competent and experienced FMS Project Manager. The Project Manger shall attend scheduled Project Meetings as required and shall be empowered to make technical, scheduling and related decisions. At minimum, the Project Manager shall:
   1. Manage the scheduling of the work to ensure that adequate materials, labor and other resources are available as needed.
   2. Maintain the scheduling of the work and report monthly in writing on progress.
   3. Maintain a legible copy on-site of, at minimum, the following documentation:
      a. The FMS Contract Documents including all approved Change Orders.
      b. All FMS related written Requests for Information and responses.
      c. All approved Shop Drawings and other submittals.
      d. A copy of the FMS Contract Schedule.
      e. Primary FMS related correspondence and minutes
      f. A record of daily on-site manpower deployment
      g. Other records as pertinent and required by the Contract Documents.

B. Provide a complete, neat and workmanlike installation. Use only manufacturer employees who are skilled, experienced, trained, and familiar with the specific equipment, software and configurations to be provided for this Project.

1.5 SHOP DRAWING SUBMITTALS:

A. Shop Drawings, Product Data, and Samples:
   1. Submit shop drawings within 45 days of contract award.

2. Submittals shall be prepared by Cad format on 17" x 11" size and bound in brochure form. The submittals shall show the relatedness of all specified DPNS functions.
3. Submittals shall be in defined packages. Each package shall be complete and shall only reference itself and previously submitted packages.
4. Equipment and systems requiring approval of local authorities must comply with such regulations and be approved. Filing expenses shall be included as part of this contract where filing is necessary. Provide a copy of all related correspondence and permits to the Owner.
5. Prepare an index of all submittals and shop drawings for the installations. Index shall include a shop drawing identification number, Contract Documents reference and item description. Submit this index prior to the submittal of any shop drawings and within 4 weeks after Contract award.
6. At a minimum, submit the following:
   a. Product data sheets for all products including Software, Valves, Relays, Panels, Gauges, Sensors, Thermostats, Switches, Pressure Controllers, Facilities Management Panels, Stand Alone and Application Specific Controllers, etc. Submittal shall indicate arrangements, capacities, range, voltage, horsepower, construction, etc.
   b. FMS network architecture diagrams including all Controllers and interconnections.
   c. Schematics, sequences and flow diagrams.
   d. Points schedule for each real and virtual (software) point in the FMS, including: Tag, Point Type, System Name, Object Name, Expanded ID, Display Units, Controllers Type, Address, Cable Destination, Module Type, Terminal ID, Panel, Slot Number, Reference Drawing, and Cable Number.
   e. Detailed Bill of Material list for each Controller, identifying quantity, part number, description, and optional features.
   f. Control Damper Schedule including a separate line for each damper and a column for each of the damper attributes, including: Code Number, Fail Position, Damper Type, Damper Operator, Blade Type, Bearing Type, Seals, Duct Size, Damper Size, Mounting, and Actuator Type.
   g. Control Valve Schedules including a separate line for each valve and a column for each of the valve attributes: Code Number, Configuration, Fail Position, Pipe Size, Valve Size, Body Configuration, Close off Pressure, Capacity, Valve CV, Calculated CV, Design Pressure, Actual Pressure, and Actuator Type.
   h. Details of all FMS interfaces and connections to the work of other trades.
   i. Training provided, including outlines for each session.

1.6 RECORD DOCUMENTATION:

A. Operation and Maintenance Manuals:
   1. Six (6) copies of the Operation and Maintenance Manuals shall be submitted upon completion of the project. The entire Operation and Maintenance Manual shall be furnished on Compact Disc media, and include the following for the FMS provided:
      a. Table of contents.
      b. As-built system record drawings. Computer Aided Drawings (CAD) record drawings shall represent the as-built condition of the system and incorporate all information supplied with the approved submittal.
      c. Manufacturers product data sheets for all products including software.
      d. System Operator's manuals.
      e. Archive copy of all site-specific databases and sequences.
      f. FMS network diagrams.
      g. Wiring termination schedules.
      h. Interfaces to all third-party products and work by other trades.
   2. The Operation and Maintenance Manual CD shall be self-contained, and include all necessary software required to access the project record drawings and data sheets. A logically organized table of contents shall provide dynamic links to view and print all project record drawings and

product data sheets. Viewer software shall provide the ability to display, zoom, and search all documents. The CD-ROM(s) shall contain adequate space for future system updates.

B. On-line Documentation: After completion of all the tests and adjustments listed above, install the following information on the FMS:
   1. "AS-BUILT" drawing files
   2. Detailed catalog data on all installed system components with address and phone number of factory repair service.

1.7 WARRANTY:

A. Standard Material and Labor Warranty:
   1. Provide a one-year labor and material warranty on the FMS.
   2. If within twelve (12) months from the date of substantial completion of the FMS, upon written notice, it is found to be defective in operation, workmanship or materials, it shall be replaced, repaired or adjusted.
   3. Warranty work shall be done during normal business hours.
   4. Maintain an on-site record of all work done, all items removed from site, all items returned to site, all new replacement items installed and all remedial programming and database entry work undertaken including software revisions installed. Maintain a record of all re-calibrations required as a result of Warranty service.

PART 2 – PRODUCTS

2.1 FMS ARCHITECTURE:

A. General
   1. The FMS shall consist of a number of controllers and associated equipment connected by industry standard network practices. All communication between controllers shall be by digital means only.
   2. The FMS network shall at minimum comprise of the following:
      a. Web based network controllers of quantity adequate to provide all points listed in the point list plus an additional 20 percent spare capacity.
      b. Network processing, data storage and communication equipment including file servers as needed to provide proper speed through put of data from Network controllers to facility intranet/internet systems.
      c. Routers, bridges, switches, hubs, modems and the like communications equipment.
      d. Active processing controllers including field panels.
      e. Intelligent and addressable elements and end devices.
      f. Third-party equipment interfaces (as applicable).
      g. Other components required for a complete and working FMS.
   3. The FMS network at each building shall be accessible via the School District's Wide Area Network (WAN) utilizing Enterprise Intranet and Internet browsers with security protection for user access.
   4. Provide licenses for all applicable software residing in the FMS system and transfer these licenses to the Owner prior to completion.

B. Network
   1. The FMS shall incorporate a primary Tier 1 network. The FMS may also incorporate integrated secondary Tier 2 and tertiary Tier 3 networks.
   2. The FMS Network shall utilize an open architecture capable of:
      a. Utilizing standard Ethernet communications and operate at a minimum speed of 10Mb/sec.
      b. Connecting via BACnet.
      c. Connecting via N2 protocol.
      d. Connecting via LON works
   3. The FMS network shall support both copper and optical fiber communication media.

C. Third-Party Interfaces
   1. Integrate real-time data from systems supplied by other trades as required in Part 3.
   2. The FMS system shall include necessary FMS hardware equipment and software to allow data communications between the FMS system and systems supplied by other trades.
D. Power Fail / Auto Restart
   1. Maintain the FMS real-time clock operation during periods of power outage for a minimum of 72 hours.
E. Downloading and Uploading
   1. Provide the capability to generate FMS software-based sequences, database items and associated operational definition information and user-required revisions to same on designated operator interfaces, and the means to download same to the associated application controller.
   2. Provide the capability to upload FMS operating software information, database items, sequences and alarms to designated operator interfaces with automatic archiving of same.
   3. The functions of this Part shall be governed by the codes, approvals and regulations applying to each individual FMS application.

2.2 OPERATOR INTERFACE:

A. Alarms
   1. Designated Operator Interface shall annunciate alarms generated by the FMS. The alarm management portion of the FMS network shall, at the minimum, provide the following functions
      a. Log date and time of alarm occurrence.
      b. Generate a “Pop-Up” window, with audible alarm, informing a user that an alarm has been received.
      c. Allow a user, with the appropriate security level, to acknowledge, or disable an alarm.
      d. Provide an audit trail on hard drive for alarms by recording user acknowledgment, deletion, or disabling of an alarm. The audit trail shall include the name of the user, the alarm, the action taken on the alarm, and a time/date stamp.
   2. The FMS shall annunciate diagnostic alarms indicating system failures and non-normal operating conditions.
   3. The FMS shall annunciate application alarms at minimum, as required by Part 3.
B. Reports
   1. Reports shall be generated and directed to one or more of the following: Operator Interface display, printer, or archive at the user’s option. As a minimum, the system shall provide the following reports:
      a. All points in the FMS.
      b. All points in each FMS application.
      c. All points in a specific Network Controller.
      d. All points in a user-defined group of points.
      e. All points currently in alarm in an FMS application.
      f. All points locked out in an FMS application.
      g. All FMS schedules.
      h. All user defined and adjustable variables, schedules, interlocks and the like.
      i. FMS diagnostic and system status reports.
   2. Provide for the generation by the user of custom reports as specified in Part 3.
   3. Provide all applicable standard reports of the FMS manufacturer.
C. Dynamic Color Graphics
   1. Graphic displays shall be provided for the boiler and pumping systems.
   2. The graphic displays shall be able to display and provide animation based on real-time FMS data that is acquired, derived, or entered.
   3. The user shall be able to change values (set-points) and states in system-controlled equipment.
   4. Provide a graphic editing tool that allows for the creation and editing of graphic files.

5. FMS system shall be provided with a complete user expandable symbol library containing all of the basic symbols used to represent components of a typical FMS system.

D. Schedules
   1. Provide a spreadsheet-type schedule input form for automatic FMS time-of-day scheduling and override scheduling of FMS operations shall be provided. At a minimum, the following spreadsheet types shall be accommodated:
      a. Weekly schedules
      b. Temporary override schedules
      c. Special “Only Active If Today Is a Holiday” schedules
      d. Monthly schedules
   2. Schedules shall be provided for each system or sub-system in the FMS. Each schedule shall include all commandable points residing within the system. Each point may have a unique schedule of operation relative to the system use schedule, allowing for sequential starting and control of equipment within the system. Scheduling and rescheduling of points shall be accomplished easily via the system schedule spreadsheets. Coordinate scheduling requirements with Owner.
   3. Monthly calendars for a 12-month period shall be provided that allow for simplified scheduling of holidays and special days in advance. Holidays and special days shall be user-selected with the pointing device or keyboard, and shall automatically reschedule equipment operation as previously defined on the weekly schedules.

E. Historical Trending and Data Collection
   1. Trend and store point history data for all FMS points and values.
   2. The trend data shall be stored in a manner that allows custom queries and reports using industry-standard software tools.
   3. At a minimum, provide the capability to perform statistical functions on the historical database:
      a. Average
      b. Arithmetic mean
      c. Maximum/minimum values
      d. Range – difference between minimum and maximum values
      e. Standard deviation
      f. Sum of all values
      g. Variance

F. Internet / Intranet Browser
   1. A multi-user color graphics and textual interface shall be provided that allows customers to access their FMS data via the Internet or Intranet. This interface shall use HTML- and XML-based pages to send and receive data from an FMS system to a web browser.
   2. Browser shall:
      a. Automatically reflect any changes made to the FMS system without additional programming.
      b. When installed behind a corporate firewall, shall work in conjunction with other security measures that have been implemented.
      c. Allow the user to navigate and command the FMS using the same format as the Operator Interface.
      d. Be an industry-standard browser
      e. Provide user password access control.
      f. Provide the means by which the user can create, edit and view groups of FMS data points.
      g. Provide navigation tools for moving between the views. In addition, it shall provide tools for gaining access to help and for logging out of the system.
      h. Communicate directly with the existing web-based FMS network installed in the School District.

2.3 HVAC CONTROLLERS:

A. HVAC Controllers shall provide both standalone and networked direct digital control of HVAC systems.
B. Controller shall be configured and provided for each boiler system, chiller system, VAV and Multi-Zone air handling unit, pumping systems, unit ventilator, Lighting Zone control, etc.
C. Controller shall be able to retain program, control algorithms, and set-point information for at least 72 hours in the event of a power failure, and shall return to normal operation upon restoration of power.
D. Controller shall report its communication status to the FMS. The FMS shall provide a system advisory upon communication failure and restoration.
E. For each primary HVAC system, provide means of indication of system performance and set-points at, or adjacent to the HVAC Controller.
F. For each primary HVAC system, provide a means to adjust set-points and start/stop equipment at, or adjacent to the HVAC Controller.
G. Controller shall provide a means to prevent unauthorized personnel form accessing set-point adjustments and equipment control functions.
H. Controller shall provide the ability to download and upload configuration data, both locally at the Controller and via the FMS communications network.

2.4 APPLICATION SOFTWARE:

A. HVAC Application Software
   1. Event Messaging: Provide for the automatic execution of user-defined messages on the occurrence of each predefined FMS real-time event including equipment/point status change, approaching limit or alarm, time of day and the like.
   2. Optimum Start/Stop: Provide software to start equipment on a sliding schedule based upon indoor and outdoor conditions, to determine the minimum time of HVAC system operation needed to satisfy the space environmental requirements. The program shall also determine the earliest possible time to stop the mechanical systems. The optimum start/stop program shall operate in conjunction with, and be coordinated with, the scheduled start/stop and night setback programs.
   3. Auto Alarm Lockout: Provide for scheduled and automatic lockout of alarm annunciation from equipment during non-normal operating conditions including shutdown, emergency power operation, fire alarm and the like.
   4. Demand Limiting: Provide software to limit excess utility charges caused by uncontrolled demand. Provide the ability to prioritize the demand limiting actions based on FMS system parameters.
   5. System Restart: Upon restoration of the AC power to an HVAC Node, automatically restart all equipment and restore all loads to the state as required by the FMS. Provide appropriate time delays to prevent demand surges or overload trips.
   6. Heavy Equipment Delays: The system shall provide protection against excessive demand situations during start-up periods by automatically introducing time delays between successive start commands to heavy electrical loads.
   7. Runtime Totalization: Automatically sample, calculate and store runtime hours for binary input and output points as listed in the point schedule of this specification.
   8. Analog/Pulse Totalization: Sample, calculate and store consumption totals on a daily, weekly, or monthly basis for user-selected analog and binary pulse input-type points.

2.5 PUMP VARIABLE SPEED DRIVES (VSD):

A. The pump variable speed drives (VSD) shall be UL Listed, pulse width modulation type, microprocessor controlled design. The VSD shall be compatible with motors provided with pumps.

B. The VSD shall convert 460 volts, three (3) phase, 60 Hz utility power to an adjustable frequency output for speed control from 33% to 100% of base speed. The VSD must be modifiable to accept all standard input voltage form 200 to 575 VAC. The adjustable frequency control shall be designed exclusively for variable speed applications and shall be pretested and cycled with a motor load at an elevated ambient temperature.

C. Enclosure shall be NEMA 1 ventilated for installation as a wall mounted or free-standing unit, depending on the amp rating. Drive shall be equipped with an input disconnected switch and fuses to protect against ground faults.

D. VSD shall utilize a diode bridge rectifier to convert three phases AC to a fixed DC voltage. Power factor shall remain above 0.95 regardless of speed or load. VSD's employing power factor correction capacitors shall not be acceptable. Insulated gate bipolar transistors or intelligent power modules shall be used in the inverter section to convert the fixed DC voltage to a three phase, adjustable frequency, AC output.

E. The output carrier frequency shall be randomly modulated and selectable at 2, 4, or 10 kHz depending on drive rating for low noise operation. VSD with an operable carrier frequency above kHz shall not be acceptable.

F. The VSD shall have a programmable fold-back function that will anticipate a controller overload condition and fold-back the frequency to avoid a fault condition.

G. The VSD shall be suitable for elevations to 3300 feet above sea level without derating. Maximum operating ambient temperature shall not be less than 104 degrees F. VSD shall be suitable for operation in environments up to 95% non-condensing humidity.

H. The VSD shall be capable of displaying Frequency, Voltage, Current, Kilowatts per hour, Fault identification, Percent torque, Percent power and RPM in plain English via an alphanumeric display.

I. The VSD shall be provided with a LON or BACnet card to interface with the FMS system.

2.6 VALVES:

A. Heating water valves shall be 2-way normally open or 3-way diverting, maintaining flow through the coil in the event of failure. Valves shall have proper springs and range as required to meet individual space requirements.
   1. In all cases, 2-way valves shall close against flow to prevent water hammer or noise.
   2. All valves shall have equal percentage or linear plugs where used for throttling service. All 2-position valves shall have line size connections. 3-way mixing valves have single plugs; diverting shall have double plugs.
   3. Valves 1/2" to 2" NPS shall have high grade bronze bodies with bronze trim and screw connections.
   4. All valves shall be furnished in an approved standard finish, unless otherwise specified.

B. Sizing of Valves: All valves shall be furnished to the heating contractor who will mount them as piping is installed. Valve sizes shall be as recommended by the temperature control manufacturer who shall be responsible for their proper sizing, regardless of indicated valve or line size on drawings. Water valves shall not exceed 5 psi pressure drop, unless otherwise stipulated.

2.7 FIELD DEVICES:

A. Input Devices
   1. Current Switch
      a. Materials: Encased copper
      b. Rating: 600vAC
      c. Mounting: Split Core

d. Range: 1.5amps to 50 amps
e. Action: Trip point adjustment
f. Output: SPST, N.O.
g. Special: Status LED

2. Current Transducer
   a. Mounting: Field Mounted
   b. Range: 60 Hz nominal
   c. Accuracy: +/- 2% full scale
   d. Protection: 250 A max current
   e. Output: 4-20mA
3. Water Differential Pressure Switch
   a. Materials: Brass bellows
   b. Mounting: Pipe mounted
   c. Range: 2 – 26 PSI, 1.2 PSI fixed differential
   d. Protection: 120 PSI Differential overpressure, 180 PSI static pressure.
   e. Output: Form C contacts, 50 VA
   f. Special: Pipe taps and shut off valves provided by Div. 23.
4. Differential Pressure Transducer
   a. Rating: NEMA 1
   b. Mounting: Duct Insertion, Pipe Insertion
   c. Range: 0-25 in. water column unidirectional, 0- +/- 5 in. water column bi-directional
   d. Accuracy: +/- 1% full scale
   e. Protection: 10 PSIG
   f. Output: 4-20 mA, 0-5 VDC, 0-10 VDC

B. Output Devices
1. Control Relays
   a. Materials: Gold Flash
   b. Rating: 10 amps at 120-277vAC
   c. Mounting: Standard Electrical Box
   d. Protection: NEMA 1 Housing
   e. Output: SPDT, DPDT
   f. Special: Provide LED for position indication. Provide with HOA switch, except when used in Smoke Control applications.

C. Controlled Devices
   a. Rating: NEMA 2 Enclosure
   b. Mounting: Direct mount
   c. Stroke: 90 seconds end-to-end full stroke, 15 seconds return to normal for spring return
   d. Protection: Electronic stall protection
   e. Control Input: 0-10 VDC or 0-20 mADC
   f. Power: Nominal 24 VAC
   g. Torque: Coordinate with unit manufacturer for maximum torque
   h. Duty cycle: rated for 65,000 cycles
   i. Special: Output position feedback, manual override, field selectable rotational / spring return direction, field
   j. Adjustable zero and span.

PART 3 - PERFORMANCE / EXECUTION

3.1 INSTALLATION PRACTICES:

A. FMS Wiring:
   1. Provide all conduit, wiring, accessories and wiring connections required for the installation of the Facility Management System, unless specifically shown on the Electrical Drawings under Division 16 Electrical. All wiring shall comply with the requirements of applicable portions of Division 16 and all local and national electric codes, unless specified otherwise in this section.
   2. All FMS wiring materials and installation methods shall comply with FMS manufacturer recommendations. Design all cable, conduit, cable trays, and trunking requirements for the FMS.
   3. Class 2 Wiring:
      a. All Class 2 (24VAC or less) wiring shall be installed in conduit unless otherwise specified.
      b. Conduit is not required for Class 2 wiring in concealed accessible locations. Class 2 wiring not installed in conduit shall be supported every 5' from the building structure utilizing metal hangers designed for this application. Wiring shall be installed parallel to the building structural lines. All wiring shall be installed in accordance with local code requirements.
   4. Class 2 signal wiring and 24VAC power can be run in the same conduit. Power wiring 120VAC and greater cannot share the same conduit with Class 2 signal wiring.
   5. Perform circuit tests using qualified personnel only. Provide necessary instruments and equipment to demonstrate that:
      a. All circuits are continuous and free from short circuits and grounds.
      b. All circuits are free from unspecified grounds; that resistance to ground of all circuits is no less than 50 megaohms.
      c. All circuits are free from induced voltages.
   6. Provide complete testing for all cables used under this Contract. Provide all equipment, tools, and personnel as necessary to conduct these tests.
   7. Provide for complete grounding of all signal and communications cables, panels and equipment so as to ensure system integrity of operation. Ground cabling and conduit at the panel terminations. Avoid grounding loops.

B. FMS Raceway
   1. All wiring shall be installed in conduit except as noted elsewhere in this specification. Minimum control wiring conduit size 1/2".
   2. All conduits shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
   3. Flexible Metal Conduit shall be used for vibration isolation and shall be limited to 3 feet in length when terminating to vibrating equipment. Flexible Metal Conduit may be used within partition walls. Flexible Metal Conduit shall be UL listed.

C. Penetrations
   1. Provide fire stopping for all penetrations used by dedicated FMS conduits and raceways. All other project fire stopping to be by other trade.
   2. All openings in fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
   3. All wiring passing through penetrations, including walls, shall be in conduit or enclosed raceway.
   4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true, and square.
   5. No penetrations in structural elements shall be made before receipt of written approval.

D. FMS Identification Standards
   1. Controller Identification. All controllers shall be identified by a permanent label fastened to the outside of the enclosure. Labels shall be suitable for the controller location.
   2. Cable shall be labeled at a minimum of every 18" with the FMS System manufacturer's name and the type of signal carried within the cable (i.e.: Analog Input, Analog Output, Binary Input, Binary Output, 24 VAC.).

3. Each of the cable types specified in Item A shall be of a different color coding for easy identification and troubleshooting. Recommended color coding:
   a. Analog Input Cable — Yellow
   b. Analog Output Cable — Tan
   c. Binary Input Cable — Orange
   d. Binary Output Cable — Violet
   e. 24 VAC Cable — Gray
   f. General Purpose Cable — Natural
   g. Tier 1 Comm Cable — Purple
   h. Other Tier Comm Cable — Blue
4. Raceway Identification. All the covers to junction and pull boxes of the FMS raceways shall be painted with the appropriate color.
5. Wire Identification. All low and line voltage FMS wiring shall be identified by a number, as referenced to the associated shop drawing and as-built drawing, at each end of the conductor or cable. Identification number shall be permanently secured to the conductor or cable and shall be typed.

E. FMS Controller Installation
1. The FMS panels and cabinets shall be located as indicated at an elevation of not less than 2 feet from the bottom edge of the panel to the finished floor. Each cabinet shall be anchored per the manufacturer's recommendations.
2. Be responsible for coordinating panel locations.

F. Input Devices
1. All Input devices shall be installed per the manufacturer recommendation.
2. Locate components of the FMS in accessible local control panels wherever possible.

G. FMS Line Voltage Power Source
1. 120-volt AC circuits used for the Facility Management System shall be taken from panel boards and circuit breakers provided by Division 26.
2. Circuits used for the FMS shall be dedicated to the FMS and shall not be used for any other purposes.
3. DDC terminal unit controllers may use 120-volt AC power from motor power circuits.

H. HVAC Input Devices – General
1. All Input devices shall be installed per the manufacturer recommendation.
2. Locate components of the FMS in accessible local control panels wherever possible.
3. Install all in-line devices such as temperature wells, pressure taps, duct smoke detectors, airflow stations, etc.
4. Input Flow measuring Devices shall be installed in strict with ASME Guidelines affecting non-standard approach conditions.

I. HVAC Output Devices
1. All output devices shall be installed per the manufacturers recommendation. The mechanical contractor shall install all in-line devices such as control valves, dampers, etc.
2. Electronic Signal Isolation Transducers: Whenever an analog output signal from the Facility Management System is to be connected to an external control system as an input (such as a chiller control panel), or is to receive as an input a signal from a remote system, provide a signal isolation transducer. Signal isolation transducer shall provide ground plane isolation between systems. Signals shall provide optical isolation between systems

3.2 TRAINING:

A. Training Services:
   1. Provide (12) hours of on-site orientation by a field engineer who is fully knowledgeable of the specific installation details of the project. The orientation shall, at a minimum, consist of a review of the project as-built drawings, the FMS software layout and naming conventions, and a walk through of the facility to identify panel and device locations. Training shall be conducted in four hour (maximum) sessions. Submit a schedule for training periods prior to completion of this project for approval.

3.3 START-UP PROCEDURE:

A. Fully start-up, test and adjust all aspects of the Facility Management System work.
B. Provide all necessary specialist labor, materials and tools to demonstrate that the FMS is operating in compliance with the contract. Prepare a list of noted deficiencies and submit report.
   1. Promptly rectify all listed deficiencies and that demonstrate this has been completed.
   2. Retest the deficiencies in conjunction with other trade contractors.
C. VAV Box Performance Verification and Documentation
   1. Test each VAV box for where the dampers in one half of a group of boxes are stepped towards full open while the other half are stepped towards full closed. At each step, after a settling time, box air flows and damper positions will be sampled. Following the cycle, a pass/fail report indicating results shall be produced. Possible results are Pass, No change in flow between full open and full close, Reverse operation or Maximum flow not achieved. The report shall be submitted as documentation of the installation.
   2. Submit a report based on a sampling of the VAV calculated loop performance metrics. The report shall indicate performance criteria, include the count of conforming and non-conforming boxes, list the non-conforming boxes along with their performance data, and shall also include graphical representations of performance. The sampling shall take place after completion of Test and Balance, when design cooling and heating media have been available and occupied conditions approximated for five consecutive days.
D. Acceptance Check Sheet
   1. Prepare a check sheet that includes all points for all functions of the FMS.
   2. Submit the check sheet for approval one month prior to testing.
   3. Complete the check sheet for all items and functions of the FMS and initial each entry with time/date as record of having fully calibrated and tested the FMS. Submit for review.
   4. Coordinate start-up, testing and troubleshooting with other trades as required to put system into proper operation. Assist the test and balancing contractor in verifying proper system operation and to rectify system-operating deficiencies.
   5. Verify through visual inspection (not at operator interface) that all control valves, dampers and sequences are operating properly and submit report.

3.4 FMS SPECIFIC REQUIREMENTS:

A. FMS Reports
   1. Custom reports shall be able to be set up for the building. Examples: Chiller efficiency reports, alarm reports, run time summaries, etc.
B. Graphic Displays
   1. Provide a color graphic system flow diagram display for each system with all points as indicated on the point list. Provide Historical Data Viewer functionality.
   2. Provide a color graphic display for each section in the facility. Indicate each HVAC zone, color-coded to indicate zone values and status. Provide Historical Data Viewer functionality.
   3. User shall access the various system schematics and floor plans via a graphical penetration scheme and/or menu selection.
   4. User shall penetrate from floor plan to associated HVAC system graphic.

C. Actuation / Control Type
   1. Primary Equipment
      a. Controls shall be provided by equipment manufacturer as specified herein
      b. All damper and valve actuation shall be electric.
   2. Air Handling Equipment
      a. All air handlers shall be controlled with DDC controllers
      b. All damper and valve actuation shall be electric.
   3. Terminal Equipment
      a. Terminal Air Boxes (VAV, etc.) shall have electric damper and valve actuation.
      b. Miscellaneous heating equipment (Cabinet heaters, unit heaters, radiant panels, etc.) shall have electrically actuated valves with DDC or electric/electronic control. See the Sequences of Operation and the Point List for further details.

PART 4 – CONTROL SEQUENCES

4.1 WINTER HEATING/SUMMER COOLING MODE:

A. The indexing from heating to cooling will be activated manually from the boiler room or from the FMS workstation. (Note: Chiller must be filled with water before indexing system to the cooling mode).

4.2 EXISTING HOT WATER BOILERS:

A. The existing boilers contain a self-contained, factory furnished control system interface as provided by boiler manufacturer. Control system shall include boiler sequencing, boiler pump control and burner modulation control. The system shall be enabled/disabled and receive primary loop water temperature from the FMS and shall be operated based on input from the FMS.

B. Provide interface to boilers LON or BACNET interface and install necessary field devices to properly control and monitor each boiler pump. Coordinate installation and other requirements with the boiler manufacturer.

C. GENERAL:- Modify the existing boiler plant sequence to the following:
   1. Boilers shall be controlled and monitored electronically with dedicated stand-alone controllers. Connect to LON or BACNET interface provided by boiler manufacturer.
   2. FMS shall enable boilers to operate in the winter heating modes of operation. Boilers shall be enabled to operate in the winter heating mode of operation when the outside air temperature is below 60 degree F. (adj.).
   3. Boilers shall be off in summer mode of operation.
   4. Lead-Lag Control: FMS shall totalize runtime of the boilers and alternate lead boiler every 168 hours of operation (adj.).
   5. Primary Building Loop Water Temperature Reset Schedule: Reset schedule shall be determined by the FMS and shall be adjustable, with initial schedule of 180 °F loop hot water supply temperature set point at 10 degrees F outside air temperature to 100 degrees F setpoint at 60°F outside air temperature. Primary Loop Temperature shall be set to maintain 180°F when outside air temperature is below 10°F. Coordinate minimum hot water temperature with boiler manufacturer recommendations. Provide temperature setpoint reset output to the boiler burners from the local DDC controller.

4.3 VARIABLE SPEED PUMPING SYSTEMS HWP-1 AND HWP-2:

A. GENERAL:
   1. Variable speed hot water pumps shall be controlled and monitored electronically by the FMS system with dedicated stand-alone DDC controllers.
   2. Lead-Lag Control: Totalize runtime of the pumps and alternate lead pump every 168 hours of operation (adj.).

3. Best Efficiency Program: Based on pump curves, control the pumps at the best efficiency point (lowest KW draw) while maintaining desired flow and head. Provide flow meters, KW meters and system pressures as required.
4. Provide multiple system pressure sensors for each system. Locate pressure sensors near the end of piping run for each piping circuit. Provide the following minimum number of sensors for each system:
   a. Hot Water System: 2 sensors.
5. Submit a complete pumping system profile analysis, which shall include as a minimum, the pumps performance (variable speed pump curves), and the operating characteristics in the system (system curve).
   a. This system profile analysis shall include pump motor and adjustable frequency drive efficiencies, load profile, staging points, horsepower and kilowatt/hour draw.
   b. Submittal shall include system summary sheet, sequence of operation, power and control wiring diagrams, dimensional shop drawings indicating required clearance and connection locations and sensor locations based on facility and piping configuration.
6. Controls shall function to a proven program that safeguards against damaging hydraulic conditions including, motor overload, pump flow surges, end of curve protection and Hunting.

B. SYSTEM OPERATION:
1. The variable speed primary pump systems shall be indexed “ON” from the FMS.
   a. The primary hot water pumps shall run continuously during winter heating mode of operation and during occupied periods of the summer cooling mode of operation.
2. The variable speed drives shall be controlled to maintain a constant system pressure for both the hot water pumps systems at the optimum energy consumption level. As the worst case zone deviates from set point, the DDC system pump logic controller shall send the appropriate analog signal to the AFD to speed up or slow down the pump/motor.
   a. Controls shall continuously scan and compare each process variable to its individual set point and control to the least satisfied zone. As the worst case zone deviates from set point, the VSD shall speed up or slow down the pump/motor.
   b. If the set point cannot be satisfied by the designated lead pump, initiate a timed sequence to stage a lag pump. The lag pump shall accelerate resulting in the lead pumps decelerating until they equalize in speed. Further change in process variable shall cause the pumps to change speed together.
   c. When the set point and end of curve criteria can be safely satisfied with fewer pumps, the initiate a timed destage sequence and continue variable speed operation.

C. SAFETIES AND ALARMS:
1. The variable speed pump DDC controllers shall annunciate discrete alarm conditions.
2. When a pump alarm is initiated, the discrete alarm condition causing the alarm shall be annunciated at the operator workstation.
3. Annunciate off-normal alarm whenever pump status does not equal command.

D. FAILURE MODES:
1. Pump Failure: If a pump fails to operate, its associated alarm shall be annunciated at the operator workstation. Pump shall be disabled.
2. Sensor Failure: Upon the failure of an internal analog sensor, the pump operating controls shall shutdown the pump. Upon the failure of an FMS analog sensor, an alarm will be annunciated at the operator workstation.
3. In the event of a system differential pressure failure due to a pump or VSD fault, automatically start the next variable speed pump/VSD set in sequence and continue variable speed operation.
4. In the event of the failure of a zone sensor/transmitter, its process variable signal shall be removed from the scan/compare program. Alternative zone sensor/transmitters, if available, shall remain in the scan/compare program for control. The zone number corresponding to the failed sensor/transmitter shall be displayed on the operator interface In the event of failure to receive all zone process variable signals, all VSDs shall maintain 100% speed, reset shall be automatic upon correction of the zone failure.

4.4 EXISTING CENTRAL STATION VAV AIR-HANDLING UNITS:

A. GENERAL:
1. Modify the existing VAV Air Handling unit control sequences to the following:
2. Occupied/Unoccupied/Off: The unit shall be indexed on and off and indexed into occupied/unoccupied modes of operation by the FMS.

B. CONTROL SEQUENCES:
1. Supply Fan Control:
   a. Occupied Mode:
      1) The supply fan shall run continuously.
      2) The variable speed drive (VSD) supply fan shall be controlled to maintain static pressure setpoint 2/3 downstream of the supply fan. Submit location of static pressure sensor(s) for review prior to installation. Provide static pressure sensors and wiring to variable speed drives as required. The supply and return fan VSDs shall be commanded to 0% for the “System OFF” mode.
   b. Unoccupied Mode:
      1) The supply fan shall operate intermittently to maintain the duct static pressure set point.
   c. Supply air static pressure control shall be determined by the FMS.
      1) Static Pressure Reset control for variable air volume systems is to be provided to reset the static pressure setpoint in the ductwork system based on the position of the VAV dampers for all variable volume boxes within the system to minimize the static pressure required in the system.
   d. Flow measuring stations are to be provided to control and monitor the system supply air flow.
   e. OFF mode of operation: Same as un-occupied mode of operation, except the supply fan shall remain OFF.
2. Air Temperature Control:
   a. Supply air temperature reset control is to be provided for variable air volume systems to reset the discharge supply air temperature setpoint inversely proportional to the outside air temperature. Reset schedule shall be adjustable, with initial schedule of 55°F discharge air supply temperature setpoint for 50 degrees F outside air temperature (and above) to 65°F setpoint at 0°F outside air temperature (adj).
   b. Heating System Control:
      1) The heating coil valve shall modulate to maintain discharge air temperature as determined by the FMS.
   c. Cooling System Control:
      1) Modulate chilled water coil control valve to maintain discharge air temperature as determined by the FMS.
   d. Power Failure Restart:
      1) In the event of a power failure, unit control system shall sequence the unit to re-start beginning with the first stage of cooling or heating as determined by the FMS.
3. Outside Air Dampers:
   a. Un-Occupied Mode:
      1) Outside air dampers shall be closed.
   b. Occupied Mode:
      1) Minimum Outside Air Damper:
   c. Economizer Dampers:
      1) Economizer Mode: Integrated enthalpy economizer control is to be provided to control economizer dampers to provide free cooling when the temperature and humidity of the outdoor air is below outside air and enthalpy set points.
      2) Economizer dampers shall modulate in sequence with the chilled water valve to maintain mixed air temperature set point determined by the FMS.

4. Morning Warm Up/Cool Down Control:
   a. The warm up mode shall be utilized in the heating mode of operation. The FMS shall determine the length of time needed to operate in the warm up mode.
      1) The FMS shall determine required discharge air temperature and modulate heating coil control valve to maintain discharge air temperature set point.
      2) Supply fan shall start and run continuously.
      3) The outside air dampers shall be fully closed.
      4) FMS shall index space temperature set-points to occupied temperatures for VAV boxes.
   b. The cool down mode shall be utilized in the cooling mode of operation. The control system shall determine the length of time needed to operate in the cool down mode.
      1) Supply fan shall start and run continuously.
      2) The outside air economizer damper shall be fully closed and exhaust fan shall be disabled.
      3) The unit shall modulate cooling capacity to maintain discharge air temperature at 55 ° F (adj). Economizer shall be enabled to provide free cooling as determined by the dedicated outside rooftop unit controls.
      4) FMS shall index space temperature set-points to occupied temperatures for VAV boxes.

C. SAFETIES AND ALARMS:
   1. Mixed Air Low Temperature Limit: An electric low limit thermostat with 20' element serpentined across the leaving side of the heating coil shall stop the fan systems, close the outdoor air dampers, open the heating coil valve fully, and annunciate alarm should the coil discharge air temperature fall below 38 °F (adj.).
   2. Supply Air High Temperature Limit: A high limit temperature sensor located in the supply air ductwork shall stop the fan systems and annunciate alarm should the supply air temperature rise above 125 degrees F. Dampers and control valves shall be indexed to their "System Off" conditions.
   3. Supply Air Low Temperature Limit: A low limit temperature sensor located in the supply air ductwork shall stop the fan systems and annunciate alarm should the supply air temperature drop below 42 °F. Dampers and control valves shall be indexed to their "System Off" conditions.
   4. Static High Pressure Limits: Supply fans will be shut down if the discharge air static pressure exceeds 4-1/2" WC (5-1/2"WC for variable air volume systems).
   5. Static Low Pressure Limits: Return fans will be shut down if the suction air static pressure exceeds 3" WC negative pressure.
   6. All alarms shall be reported to the operator workstation for the FMS.

D. FAILURE MODES:
   1. Fan Failure: If any fan fails to operate, an alarm shall be annunciated. Dampers and control valves shall be indexed to their "System Off" conditions.
   2. Sensor Failure: Upon the failure of an analog sensor, the associated dampers and control valve shall remain at their last position and an alarm shall be annunciated.
   3. Power Failure:
      a. Fans: Upon restoration of power, the supply and return fans shall start after an adjustable delay to provide a staggered start of all building loads.

4.5 EXISTING VAV TERMINAL WITH HOT WATER REHEAT:

A. GENERAL:
   1. Modify the existing VAV box sequences to the following:
   2. There shall be separate adjustable room temperature heating and cooling set-points for each VAV box for Heating, Cooling, Occupied and Unoccupied modes of operation:

Mode of Operation	Heating Setpoint (adj.)	Cooling Setpoint (adj.)
Heating – Occupied	68°F	72°F
Heating – Unoccupied	65°F	75°F
Cooling Occupied	65°F	75°F
Cooling – Unoccupied	65°F	78°F

3. The VAV box damper and hot water heating control valve shall modulate to closed position when the air-handling system is OFF.
4. Calibrate each VAV box flow sensors with the assistance of the test and balancing contractor. Submit calibration report.
5. Modify control and monitoring points as listed in the Point List at the end of this section.
6. Alarms: High and Low Room Temperature alarms.
7. Fail Positions: VAV Box damper shall fail to open position and the heating control valve shall fail to closed position.
8. Warm-Up and Cool Down Modes: VAV Box damper and heating control valve sequences to match OCCUPIED mode of operation sequence and setpoints.

B. OCCUPIED and UNOCCUPIED MODES:
1. Upon a signal from the FMS for the associated air handling unit serving the terminal box to start, the terminal unit controller shall also be activated and the unit damper shall modulate open to minimum position.
2. When the room temperature is between heating and cooling setpoints as sensed by the room's thermostat/sensor, the unit damper shall be at minimum position and the heating control valve shall be closed.
3. Upon a rise in room temperature above room temperature cooling set-point, the unit damper shall modulate open (increasing CFM) between minimum and maximum damper positions to maintain the occupied or unoccupied room temperature set-point. Upon a decrease in room temperature, the reverse shall occur.
4. Upon a drop in temperature below room temperature heating set-point the following shall occur:
   a. Heating Mode OPEN/CLOSED/OPEN: The hot water valve shall modulate open (unit damper remaining at minimum position) to maintain room set-point. On a further fall in room temperature the terminal unit damper shall modulate open to increase heating CFM maintain room set-point. Upon a rise in room temperature the reverse shall occur.
   b. Heating Mode OPEN/CLOSED: The hot water valve shall modulate open (unit damper remaining at minimum position) to maintain room set-point. Upon a rise in room temperature the reverse shall occur.
   c. Cooling Mode: Damper shall remain at minimum airflow position. If space is unable to be maintained for ten (10) minutes an alarm shall be sent to the FMS system. Upon notification of the alarm, the Owner shall determine if the hot water heating boilers shall be activated to increase space temperature.

4.6 POINTS LIST:

A. Refer to the following attached pages for description of required additional control points to be added for each system.

System: Boilers	DDC INPUT/OUTPUT SUMMARY TABLE																																	
Serves:	HARDWARE																SOFTWARE																	
Location:	OUTPUT							INPUT									ALARM								APPLICATION PROGRAMS									
Graphics: Yes	Digital			Analog				Digital				Analog					Digital					Analog													
Point Description:	Start/Stop	Enable/Disable	Open/Close	Control	Set Point Adjustment	Electronic		Status	Alarm	KW Pulse		Temperature	Pressure	Flow	CO2	Parts per Million	Equipment Alarm	Critical	Notification			High Limit	Low Limit	Run Time	Scheduled	Optimal Start Stop	Morning Warm Up	Demand Limit	Economizer	Unit Control Panel	Graphic Control	Trend	Point History		
Unit Controller																													X					
Boiler B-1, B-2	X	X						X	X									X	X					X		X				X	X	X		
Boiler Pump BP-1 & 2	X							X	X									X	X											X	X	X		
HWP-1 & 2 VFD	X	X						X	X									X	X										X	X	X	X		
Primary HWS Temp												X										X	X							X	X			
Primary HWR Temp												X										X	X							X	X			
B-1 & 2 HWS Temp												X										X	X							X	X			
B-1 & 2 HWR Temp												X										X	X							X	X			
Outdoor Air Temp												X																						

System: VAV AHU	DDC INPUT/OUTPUT SUMMARY TABLE																																		
Serves:	HARDWARE															SOFTWARE																			
Location:	OUTPUT							INPUT								ALARM								APPLICATION PROGRAMS											
Graphics: Yes	Digital			Analog				Digital				Analog				Digital					Analog															
Point Description:	Start/Stop	Enable/Disable	Open/Close	Control	Set Point Adjustment	Electronic		Status	Alarm	KW Pulse		Temperature	Pressure	Flow	CO2	Parts per Million	Equipment Alarm	Critical	Notification			High Limit	Low Limit	Run Time		Scheduled	Optimal Start Stop	Morning Warm Up	Demand Limit	Economizer	Unit Control Panel	Graphic Control	Trend	Point History	
Supply Fan	X	X						X	X								X	X	X						X	X					X	X			
Supply Air Volume												X										X	X								X	X			
Discharge Air Temp												X										X	X									X			
Duct Static Pressure				X	X				X				X																		X	X	X		
Outside Air Volume														X																		X			
Supply Static High Limit									X				X																						X
Return Static Low Limit									X				X																						X
Supply Fan VFD				X	X																														

System: Various	DDC INPUT/OUTPUT SUMMARY TABLE																																
Serves:	HARDWARE																		SOFTWARE														
Location:	OUTPUT							INPUT									ALARM								APPLICATION PROGRAMS								
Graphics: Yes	Digital			Analog				Digital				Analog					Digital					Analog												
Point Description:	Start/Stop	Enable/Disable	Open/Close	Control	Set Point Adjustment	Electronic		Status	Alarm	KW Pulse		Temperature	Pressure	Flow	CO2	Parts per Million	Equipment Alarm	Critical	Notification			High Limit	Low Limit	Run Time	Scheduled	Optimal Start Stop	Morning Warm Up	Demand Limit	Economizer	Unit Controler	Graphic Control	Trend	Point History	
VAV Box																																	
Space Temp												X										X	X							X	X	
Space Temp Adj.					X																									X	X	
Occup.Htg/Clg Setpoint					X																										X	
Unocc Htg/Clg Setpoint					X																										X	
Warmup cycle	X																									X						X
Box CFM													X	X																X	X	
Volume Damper				X	X																										X	
Reheat Coil Valve				X	X									X																X	X	
Un-Occupied Override												X																				

DIVISION 15990

TESTING, ADJUSTING, AND BALANCING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK:

A. This section of work includes the furnishing of labor and materials required for the testing, adjusting, and balancing of the mechanical water systems, and equipment operating conditions.

B. Review and inspection of mechanical equipment, devices, and appurtenances as the work progresses to verify the system when complete will properly function and allow testing and balancing to proceed, review submittals to insure required testing and balancing equipment, test connections, etc. are provided.

C. Attend construction meetings on a regular basis, as the work progresses, to report on the status of the installed mechanical system and to report deficiencies witnessed by this contractor. Submit written observation reports after each visit.

D. In addition to the site visits listed above, this Contractor shall attend monthly mechanical meetings as scheduled below involving the Architect, Engineer, Owner, Contractor, Mechanical Contractor and Sub-Contractors including the temperature control contractor, test and balance contractor, electrical contractor, and others whose work may affect the testing and balancing procedures.
   1. Two (2) months prior to the Substantial Completion Date.
   2. One (1) month prior to the Substantial Completion Date.

1.2 REFERENCES:

A. AABC MN-1 – AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.

B. ASHRAE Std. 111 – Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 1988

C. NEBB (TAB) – Procedural Standards for Testing Adjusting Balancing of Environmental Systems; National Environmental Balancing Bureau; 1998, Sixth Edition.

D. TABB – TAB Procedural Guide; Testing, Adjusting and Balancing Bureau; latest edition.

1.3 SHOP DRAWING SUBMITTALS:

A. Submit name of adjusting and balancing agency.

B. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Prior to commencing work, submit forms or outlines indicating adjusting, balancing, and equipment data required.
   2. Submit draft copies of report for review prior to Substantial Completion. Provide copies for inclusion in operating and maintenance manuals.
   3. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
   4. Include detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guaranty prior to commencing system balance.
   5. Test Reports: Indicate data on AAABC MN-1 forms.
   6. Include the following on the title page of each report:
      a. Name of Testing, Adjusting, and Balancing Contractor
      b. Address of Testing, Adjusting, and Balancing Contractor

c. Telephone number of Testing, Adjusting, and Balancing Contractor
d. Project Name
e. Project Location
f. Project Architect
g. Project Engineer
h. Project General Contractor, Mechanical Contractor, and Temperature Control Contractor
i. Project altitude
j. Report date

C. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

D. Final Test and Balance Reports must be submitted no later than two (2) weeks prior to the indicated Substantial Completion Date. If reports are not submitted as outlined, payments to the Contractor will not be processed.

1.4 QUALITY ASSURANCE:

A. Perform total system balance in accordance with AABC MN-1, ASHRAE Std. 1111, TABB or NEBB Procedural Standards for Testing, Balancing, and Adjusting of Environmental Systems.
1. Maintain one copy of each document on site.

B. Perform work under supervision of AABC Certified Test and Balance Engineer experienced in performance of this Work and licensed at the State in which the Project is located.

1.5 TEST AND BALANCE CONTRACTOR:

A. Work for the testing and balancing of the HVAC water distribution system, as described herein, shall be completed by one of the independent Test and Balance Contractors listed below and specialize in and whose business if limited to the testing and balancing of heating, ventilating, and air conditioning systems:
1. Aaron Engineering Services
5420 W. Roosevelt Rd.
Chicago, IL 60644
2. Mechanical Test & Balance
P.O. Box 182
Crown Point, IN 46307
3. Controlled Environment Testing & Balancing
1350 Remington Road
Schaumburg, IL 60173

1.6 COORDINATION:

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.7 WARRANTY:

A. Guarantee: Provide a guarantee on NEBB or TABB forms stating that NEBB or TABB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:
1. The certified TAB firm has tested and balanced systems according to the Contract Documents.

PART 2 – GENERAL

2.1 MATERIALS:

A. Instruments shall be calibrated and maintained in good working order.

B. Provide additional balancing devices as required to complete the work.

PART 3 – EXECUTION

3.1 EXAMINATION:

A. Verify as work progresses that balancing devices, such as test ports, thermometer wells, flow-control devices, balancing valves and fittings, as required by the Contract Documents are provided. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in Division 1 Section “Project Record Documents.”

D. Examine equipment performance data including pump curves. Related performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in a system.

E. Examine system and equipment installations as work progresses to verify that they are complete and that testing, cleaning, adjusting, and commissioning have been performed.

F. Examine HVAC system and equipment installations as work progresses, to verify that indicated balancing valves and fittings are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

G. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing and report.

H. Examine HVAC equipment to ensure as work progresses and prior to test and balance, bearings are greased, and equipment with functioning controls are ready for operation.

I. Examine strainers for clean screens and proper perforations.

J. Examine system pumps to ensure absence of entrained air in the suction piping.

K. Examine equipment, as work progresses, for installation and for properly operating safety interlocks and controls.

L. Examine, as work progresses and prior to Test and Balance, automatic temperature control system (B.A.S) components to verify the following:
   1. Sensors are located to sense only the intended conditions.
   2. Sequence of operation for control modes is according to the Contract Documents.
   3. Controller set points are set at indicated conditions.
   4. Interlocked systems are operating.
   5. Changeover from heating to cooling mode occurs according to indicated values.

M. Report deficiencies, which are discovered before and during performances of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

N. Examine, as work progresses and prior to test and balance, the following:
   1. Proper thermal overload protection is being provided and is complete.

3.2 TESTING AND START-UP:

A. After piping has been installed, but before pipe covering has been applied or concealed piping has been covered up, test the tightness of joints and the soundness of pipes.

B. Provide notification of tests, including the inspectors or authorities having jurisdiction. Provide labor and equipment for tests and conduct same. Repeat tests until system is shown to be leak tight and in proper working condition. Submit three (3) copies of test reports for review.

C. Perform tests in shifts to allow other trades to proceed in accordance with building progress.

D. Perform tests as required to provide specified and satisfactory operation of equipment. Adjust balancing valves, controls, etc., to establish system operation as prescribed. Adjust circuit setters for required gpm flow.

E. Before putting systems in operation, perform the following functions:
   1. Clean screens, strainers, and dirt pockets.
   2. Supply and install lubricants required for bearings, couplings, etc. After completion of installation of electrical motors, pumps, etc., these shall be completely relubricated and bearings repacked. This work shall be completed prior to putting equipment into operation and shall be in accordance with the manufacturer's requirements.
   3. Manufacturer's representatives shall check equipment installation to ensure that connections, alignment and other details affecting the equipment performance are in accord with manufacturer's requirements.
   4. Instruct Owner in system operation and see that arrangements have been made for regular maintenance of equipment and services where required.

F. Submit three (3) copies of the final certified test readings.

3.3 BALANCING THE SYSTEMS:

A. The work to be performed under this section of the specifications shall include the furnishing of articles, labor, material, operations, and equipment necessary and incidental for the Testing and Balancing of the HVAC Systems as described in this specification and shown on the drawings.

B. Work shall be done under the direct supervision of a certified test and balance engineer employed by the contractor. Instruments used by the contractor shall be accurately calibrated and maintained in good working order.

C. Reports shall be submitted on standard forms similar to those shown in the National Standards for Field Measurements and Instrumentation Manual, published by Associated Air Balance Council.

D. Work shall not begin until systems which are to be tested have been completed and are in full working order. Filters shall be restored and coils cleaned before system is balanced. The contractor shall put system equipment into full operation and shall continue the operation of equipment during each working day of the testing and balancing work.

E. In order to meet the required tolerance of the plans and specifications, the following general testing and balancing procedures shall be used by the contractor:
   1. Water Systems: The test and balance agency or technician shall prepare the water systems for balancing in the following manner. Work shall include boiler pumps and building hot water heating pumps and other pieces of equipment and devices that will or may affect the hydronic characteristics of the system.
      a. Phase One:
         1) Open valves to full open position. Close coil by-pass stop valves. Set mixing valve to full coil flow.
         2) Remove and clean strainers.

3) Examine water in system and determine if water has been treated and cleaned. If not, clean and treat water in accordance with contract documents.
4) Check pump rotation.
5) Check expansion tanks to determine that they are not air bound and that the system is completely full of water. If not, correct situation to be in conformance with Contract Documents.
6) Check air vents at high points of water systems and determine if installed and operating freely.
7) Check operating of automatic by-pass valves.
8) Check and set operating temperatures and pressures of boilers and heat exchanger to design requirements.
9) Complete air balance must have been accomplished before actual water balance begins.

b. Phase Two:
1) Set water pumps to proper gallons per minute delivery.
2) Check leaving water temperatures and return water temperatures through heating equipment. Reset to correct design temperatures.
3) Check water temperatures at inlet side of boilers. Note rise or drop of temperature from source. Set and record readings on branch line circuit setters.
4) Upon completion of flow readings and adjustments at coils, mark settings and record data.
5) In variable speed pumping systems where the total pump capacity is not equal to total capacity of zone and terminal unit gpms, reset primary system for intended diversity and repeat steps above. Coordinate system setting with variable speed pumping system manufacturer.
6) For primary/secondary flow systems, balance the primary system crossover first, then balance the secondary circuits. Note the difference between available and design flow and balance proportionally.

c. Phase Three: Upon completion of Phases One and Two, proceed with Phase Three as follows:
1) After adjustments to coils are made, recheck settings at the pumps and equipment and readjust if required.
2) Record and check the following items at each cooling and heating element:
a) Inlet water temperatures.
b) Leaving water temperatures.
c) Pressure drop of each coil.
d) Gpm flow rate.
3) Pump operating suction and discharge pressure and final T.D.H.
4) List mechanical specifications of pumps.
5) Rated and actual running amperage of pump motor.

F. Test and Balance Report: Upon completion of the work, information shall be inserted on a sheet listing items required by these specifications and be included in complete Test and Balance report. Sheets shall be neatly typed.

END OF SECTION 15990

DIVISION 16050

ELECTRICAL WORK GENERAL CONDITIONS

PART 1 - GENERAL

A. Drawings and General Provisions of Contract, including General Conditions and Special provisions, Division 1, apply to work of Division 16.

B. This Section is a part of each Division 16 section as applicable to the work specified therein.

1.1 DESCRIPTION OF WORK:

A. The articles under this section form a part of electrical work contracts.

B. Provide the complete Electrical System as shown on the drawings and specified herein. Such work includes, but is not limited, to the following:

1. Power distribution panelboards
2. Lighting distribution panelboards
3. Motor control centers, starters and control wiring
4. Safety disconnect switches
5. Pull boxes and cabinets
6. Receptacles, devices, switches and special outlets
7. Branch circuit conduit and wiring
8. Grounding systems
9. Lighting fixtures and lamps (Note: All lamps to be installed at substantial completion. Any lamps used prior to substantial completion must be replaced)
10. Control panels, control devices and system wiring
11. Wiring equipment installed by others
12. Receiving, unload, store, protect, install, wire, connect and test equipment furnished by others
13. Conduit for communication systems
14. Temperature control system and wiring of all HVAC equipment
15. Process control and system wiring of equipment

1.2 STANDARDS:

A. Work shall conform with federal and local codes having jurisdiction. All material and equipment shall be new and conform to NEMA, Underwriters' Laboratories, Inc., ANSI, and IEEE Standards.

B. All work shall be installed with code jurisdiction as a minimum requirement. All work shall be installed as specified or as required by code.

C. In cases of difference between building codes, specifications, state laws, federal and local ordinances, industry standards, and utility company regulations, and the contract documents, the most stringent shall govern. The contractor shall promptly notify the Architect/Engineer in writing of any such differences prior to installation of work.

D. Should contractor perform any work that does not comply with requirements of applicable building codes, state laws, federal and local ordinances, industry standards, and utility company regulations, he shall bear all costs arising for correction of non-complying items.

E. The use of equipment or materials containing P.C.B.s (polychlorinated biphenols) and/or asbestos is not permitted.

1.3 PRODUCTS, MATERIALS, AND WORKMANSHIP:

A. Materials used through this installation shall be the best of their respective kind and the same shall be installed in a neat, accurate, and workmanlike manner, and in a manner to permit the work of other trades to also be installed wherever the work covered by this specification meets with, or must be considered, in connection with the work of other trades working on this installation. This workmanship and these materials must be executed and furnished in a manner entirely satisfactory to the Architect and the Engineer.

B. Wherever in the specifications, a particular article or material is definitely mentioned, it shall be provided and no substitutions shall be allowed, especially insofar as the submittal of the base bid is concerned. Should this contractor desire to substitute other materials for those specified, he may submit these substitutions in the form of voluntary alternates to the base bid, designating appropriate additions or deductions for each alternate. Should no alternates be submitted, the contract shall be entered into on the basis of the specified base bid equipment. Final review of equipment shall be by the Architect/Engineer. Voluntary alternates will only be recognized at the time of bid.

C. A specification item followed by one (1) or more manufacturers; names of other manufacturers may be submitted for review to the Architect/Engineer a minimum of seven (7) days prior to receiving bids. Acceptance will be granted only if issued by addendum (no exceptions).

D. A specification item followed by one (1) or more manufacturers and "or equal" is open to all equal products or materials. However, contractor shall supply one (1) of the listed manufacturers at no additional cost if Engineer determines substituted product unsatisfactory.

E. Lighting substitution requests shall include the following:
   1. Specified and proposed manufacturer's product data sheet, noting options and features.
   2. Provide dimensioned drawing of luminaire.
   3. Provide photometric data in form of an electronic IES file on 3-1/2" on CD, for use in a recognized computer lighting program.
   4. Substitution supplier shall perform complete photometric studies for Engineer evaluation to prove fixture performance meets or exceeds specified fixture. Final decision by the Engineer.
   5. Fixtures not meeting the performance level of the specified fixtures, in the opinion of the Engineer, will not be allowed.
   6. Fixtures not meeting the quality level and appearance criteria of the specified luminaires, in the opinion of the Engineer, will not be allowed.

F. Electrical items of identical or similar characteristics shall be of the same manufacturer to facilitate maintenance and spare parts.

G. All equipment requiring servicing shall be selected from manufacturers who have local dealers or distributors when possible. In any case, contractor shall deliver a complete inventory of installed items listing the source for servicing, spare parts and replacement units.

1.4 SHOP DRAWINGS AND REVIEW OF MATERIALS:

A. Architect/Engineer shall review all materials, equipment, fixtures, motor control centers, panelboards, control panels, etc., and other appurtenances provided for this work before proceeding with the purchase and installation.

B. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Architect to ascertain that the proposed equipment/fixtures and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment/fixtures being submitted.

C. Submittals for individual systems and equipment assemblies, which consist of more than one item or component, shall be made for the system as a whole. Where necessary, submit plans of the system drawn on sheet sizes same as the contract drawings. Partial submittals will not be considered for review.

D. Contractor shall submit six (6) shop drawing copies for all equipment for review by the Architect/Engineer. All equipment, conduit, light fixtures, etc. installed before submission and review of shop drawings is subject to removal and relocation at the contractor's expense as directed by the Architect/Engineer. Engineer's review of shop drawings will be rendered as a service only and shall not be considered as a guarantee of measurements or of building conditions, nor shall it be construed as relieving the contractor of basic responsibilities under his contract.

E. If the shop drawings show variations from contract requirements because of shop practice or other reasons, contractor shall make specific reference to such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment.; otherwise contractor will not be relieved of the responsibility for executing the work in accordance with contract documents even though such shop drawings have been reviewed.

F. All shop drawings shall be submitted to permit Architect/Engineer ample time to review before material is released for delivery to job.

G. Contractor shall maintain a permanent file of shop drawings to turn over to Architect at completion of project.

1.5 PERMITS AND FEES:

A. Obtain and pay for all licenses, permits, and inspections for all work covered by this contract. Final Certificate of Inspection shall be delivered to the Architect before application is made for final payment.

B. Immediately correct all work which is found unacceptable by the Architect/Engineer; work shall be considered unacceptable when it is contrary to the plans and/or specifications and/or the National Electric Code, local jurisdiction, and/or accepted standards of good workmanship.

1.6 RECORD DRAWINGS:

A. Provide to Architect one (1) complete set of sepia mylar tracings, two (2) sets of prints (as installed), and one (1) electronic file showing complete electrical plans with all changes correctly shown thereon. Plans shall include the actual routing of raceways larger than 2”.

B. Provide complete set of shop drawings bound in permanent binder.

C. Provide typewritten list of each type, quantity and manufacturer of lamp installed.

D. Provide typewritten list of each type, quantity, size and manufacturer of fuse, motor overload heater, etc., installed.

E. Provide a complete list of all replaceable components for maintenance purposes.

1.7 MAINTENANCE & OPERATING MANUALS:

A. Maintenance and Operation Manual, submit as required for systems and equipment specified in the technical sections. Furnish five (5) copies, bound in hardback binders, manufacturer's standard binders or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.

B. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of contractor and contract number. Include in the manual the names, addresses and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.

C. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.

D. The manual shall include:
   1. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment
   2. A control sequence describing start-up, operation and shutdown
   3. Description of the function of each principal item of equipment
   4. Installation and maintenance instructions
   5. Safety precautions
   6. Diagrams and illustrations
   7. Testing methods
   8. Performance data
   9. Lubrication schedule including type, grade, temperature range and frequency
   10. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts and name of servicing organization.
   11. Appendix list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

1.8 POSTED OPERATING INSTRUCTIONS:

A. Furnish approved operating instructions for systems and equipment indicated in the technical sections for use by operation personnel. The operating instructions shall include wiring diagrams, control diagrams and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions were directed. Attach or post operating instructions adjacent to each principal system and equipment including start-up, operating, shutdown, safety precautions and procedure in the event of equipment failure. Provide weather-resistant materials or weatherproof enclosures for operating instructions exposed to the weather. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal.

1.9 MANUFACTURER'S RECOMMENDATIONS:

A. Where installation procedures or any part thereof are required to be in accordance with manufacturers' recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.

1.10 CODES:

A. The electrical system shall comply with the latest edition of National Electrical Code, hereinafter referred to as "code." The electrical equipment and installation shall also conform to the requirements of the National Fire Protection Association, Americans with Disabilities Act, local electric utility company, and all other local and municipal bureaus and departments which have authority over the project; anything in these specifications or shown on the drawings contrary to these requirements notwithstanding. This shall not be construed as waiving compliance with any requirements of the plans and specifications which may be excess of any requirements or providing such work as may be required by said organizations and codes even though work may not be shown on drawings or specified.

1.11 EXISTING HAZARDS:

A. Contractor to field verify if existing asbestos will be encountered prior to starting work. If asbestos is present, promptly notify the Owner. It will be the contractor's responsibility to take any and all steps necessary to protect all persons involved with construction and all persons at, and in the vicinity of, the site from asbestos until asbestos abatement services are provided by the Owner. The contractor assumes all liabilities resulting from asbestos exposure in connection with this project and agrees to hold the Owner and Architect harmless in regard to this matter for the period beginning from the discovery of asbestos until asbestos abatement work is started.

1.12 COORDINATION:

A. Lay out all work to be installed in consultation with the Architect in coordination with all trades engaged on this project. Cooperate with all other trades in order to coordinate all work and eliminate conflicts between this work and that of other trades. Cooperate with all other trades to coordinate all work to maintain maximum accessibility and serviceability to all equipment, dampers, valves, etc.

B. This contractor shall be fully responsible for all conflicts between this work and that of other trades engaged on this project.

C. Any and all lighting, conduit, cable tray, low voltage devices and wiring, which have been installed without checking for interferences and without maintaining maximum accessibility and serviceability, shall be modified without additional expense to the Owner.

D. Trade priority list shall be as follows unless Architect directs otherwise:
   1. Electrical Lighting Fixtures
   2. Mechanical Grilles and Diffusers
   3. Mechanical Ductwork
   4. Electrical Conduit
   5. Piping Systems
   6. Cable Tray
   7. Low Voltage Devices and Wiring

PART 2 - MATERIALS (Not Applicable)

PART 3 – EXECUTION

3.1 ERECTION AND WORKMANSHIP:

A. Adapt all work to job conditions and make such changes as required and permitted by the Architect, such as moving his work to avoid interferences with openings, ductwork, etc., all as required or as job conditions dictate, without any extra cost. Coordinate work with other trades before fixing location of outlets, conduits, cabinets, etc.

B. Material and equipment shall be installed and connected with the best engineering practice and in accordance with the manufacturer's instructions and recommendations. Fittings, connections, etc., recommended by the manufacturer or as required for proper operation, shall be provided without any additional cost.

3.2 LAYING OUT WORK:

A. Work to be installed under this Section be laid out in consultation with the Architect and in coordination with all work specified in other sections of the specifications.

B. Equipment shall be installed with ample space allowed for its removal for repairs or changes. Ready accessibility to removable parts of equipment and to wiring shall be provided so that other equipment, in place or to be installed, need not be moved at any time.

C. Sufficient access for the installation of electrical equipment shall be determined prior to delivery.

D. Compare all contract drawings and specifications to determine the intent of the two together. In case of any discrepancy between the drawings and specifications, the matter shall be referred to the Architect/Engineer before any work is installed. The interpretation of the intent shall rest solely with the Architect/Engineer, and his decision shall be considered final.

E. Refer to the architectural structural plans, etc., for all construction details, and large scale drawings and equipment shop drawings of equipment being furnished under other specification sections, for exact location of electrical outlets and connections required.

F. Any changes of the electrical layout necessary to make the work conform to the entire facility as constructed, fit the work of other trades, or conform to the rules of the city and state and/or other regulating bodies (Public Health, NFPA, etc.) shall be made without additional cost.

G. Omission in the contract drawings and/or specifications of any items necessary for the proper completion or operation of the work outlined in this specification shall not relieve the contractor from furnishing same without additional cost.

H. Provide proper size lugs in all electrical equipment for connections to feeder/conductor sizes as shown on the drawings. Coordinate with equipment supplier.

3.3 JURISDICTION OF WORK:

A. Whenever it becomes necessary for the complete fulfillment of this specification to furnish labor or materials, other than that which is generally accepted by trade agreement or general practice to belong to his particular trade or branch of work, he shall sublet such work or shall employ workmen regularly employed, to the end that there will be no delay or stoppage of work due to infringement or alleged infringement of trade agreements as to jurisdiction.

3.4 OPERATION:

A. Equipment and systems or portions thereof, which are a part of this contract, shall be ready for continuous and satisfactory operation, in a manner acceptable to the Architect/Engineer.

3.5 DUST PROTECTION:

A. Temporary partitions or barriers required to protect equipment shall be provided as required. Maintain a safe clean work area with daily clean-up.

3.6 EXAMINATION OF SITE:

A. Visit and carefully examine the site in and on which this work is to be performed and examine conditions that will affect this contract. Proper allowances shall be included in bid to cover unforeseen conditions at the project site.

B. The Architect will receive the bid with an understanding that the contractor has complete knowledge of the conditions at the site and the requirements of this specification, and included proper allowances in his bid for contingencies.

3.7 STORING ELECTRICAL EQUIPMENT AND MATERIALS:

A. Store electrical materials and equipment prior to installation in a dry location to avoid corrosion and damage from moisture.

B. Switchgear, panelboards, fixtures, and other electrical equipment stored on site shall be adequately protected to exclude dust, moisture and vermin.

C. Locate on site and schedule delivery as directed by Architect.

3.8 CARE AND PROTECTION:

A. Exposed surfaces of all material and equipment provided under this contract shall be protected against oxidation and rusting.

B. Touch-up all damaged prefinished surfaces as required or as directed by the Architect before completion of the installation.

C. All material and equipment furnished under this specification shall be left in a clean, presentable condition to the satisfaction of the Architect.

D. All panels and cabinets, starters, motors, lighting fixtures, etc., shall be clean of dust, plaster, or other debris before the Owner takes possession of the building. All contacts in the above equipment and control equipment shall be free from dust deposits.

3.9 IDENTIFICATION:

A. Provide identification for each distribution and lighting panel with a typewritten directory accurately indicating rooms and/or equipment being serviced, sealed in plastic and attached to door interior, etc. Note: Each index shall be sequenced in accord with actual panel circuiting (i.e.: left side - 1, 3, 5, 7, etc., right side - 2, 4, 6, etc.). Standard cards printed 1, 2, 3, etc., will not be acceptable.

B. Identify all safety switches, panelboards, motor control centers, motor starters, remote control pushbutton stations, etc., with engraved plastic nameplates. Nameplates shall be mechanically fastened to equipment substrate. Where fasteners cannot or should not penetrate the substrate, use a permanent adhesive.

C. The nameplates shall be in addition to the manufacturer's marking/identification tags required by NEMA/NEC requirements. The nameplates shall be 1-1/4" x 3" white with black core, plastic. Secure with two (2) #40 self-tapping screws. Lettering shall be engraved, 1/4" high minimum. Submit list of identification plate wording to Architect for review before engraving same.

D. Plastic field applied tag markers shall be placed at both terminating points of each feeder and control wire, and at each intermediate point where it is spliced or connected to a terminal block within a terminal box or piece of electrical equipment such as a starter or control panel.

E. All electrical conduit which is accessible of maintenance operations (except conduits in finished spaces) including conduits in Equipment Rooms, above lay-in ceilings, and all unoccupied and/or unfinished spaces accessible, shall be identified with approved stencils or semi-rigid plastic identification markers equal to "Setmark" pipe markers, electrical marker, or equal.

F. Setmark Type "SNA" snap-around electrical markers (or approved equal by SETON or NEBCO) to be used on diameters 3/4" through 5".

G. Covers of junction boxes (inside and outside) shall be labeled or stenciled (in lieu of conduit) with approved permanent labels denoting voltage inside box (for single phase legs, label voltage to ground; for two (2) or more phase legs, label the phase-to-phase voltage and combinations shall be suitably labeled).

H. All devices that are located remote from their main circuit protective device shall have approved identification installed where and as directed which indicates the origin of the power supply and location of main protective device, (i.e.: "Feeder #3, Main Switchboard - Circuit 13", etc.) as is applicable.

I. Provide "Danger - 480 Volts" (red with white letters) warning signs on all 480 volt equipment.

3.10 FINAL COMPLETION:

A. Work shall be cleaned prior to the date of "Substantial Completion." as determined by the Architect.

B. Clean equipment, restore all damaged materials, remove grease, oil, chemicals, paint spots and/or stains, etc., and generally leave the work in A-1 condition.

C. Retouch and/or repaint all factory painted prime and/or finish coats where scratched or damaged. Whenever retouching will not be satisfactory, in the opinion of the Architect/Engineer, the Architect/Engineer has the option to require complete repainting until the desired appearance is obtained.

D. Lamps, fixtures, lenses, reflectors, etc., shall be cleaned and not sooner than ten (10) days prior to date of substantial completion.

E. Remove from site all tools, equipment, surplus materials, and rubbish pertaining to contract work and include all costs for such removal and disposition. All rubbish left will be removed by Owner and services for same shall be back-charged to contractor against final payout on contract.

3.11 DEMONSTRATION OF COMPLETED SYSTEMS:

A. Verify completed systems and arrange date agreeable with Owner for a demonstration of completed systems. Demonstrate, at time of completion, to the Architect, in the presence of the Engineer, the essential features of the electrical allied systems and their compliance with the specifications. Riser diagram and relation to function of equipment and corresponding location in the project structure shall be demonstrated.

B. Show by start/stop operation, etc., the manner of control, resetting of protective devices and the replacement of fuses, etc.

C. Demonstrate area lighting and show the location of panelboards, dimmers, time switches and settings, etc.

D. Include a total of 16 hours for demonstration purposes. Hours and arrangement to be scheduled by Architect. All demonstration must be video recorded by the contractor and two (2) copies provided to the Architect.

3.12 TESTS:

A. During the course of construction, verify that electrical characteristics of all equipment is proper before connecting same and conduct the following tests or adjustments on the electrical installation:

1. The service entrance ground shall be tested in accordance with IEEE Standards, two (2) point method. Grounding system electrode shall be provided to limit the resistance to ground to less than 5 ohms. This test is to include measuring the resistance of the grounding electrodes and checking the continuity of the grounding system. Submit results to the Architect/Engineer, as requested.
2. Verify motors for proper rotation prior to operation.
3. Test all motor controls for proper operations.
4. All general purpose type transformers (i.e.: 480v, 3ph, 3W primary to 208/120v, 3ph, 4w- or 480v single phase to 240/120v single phase, 3 wire). Neutral shall be properly grounded on the secondary side as required by code.
5. Test all duplex receptacles for proper polarity and grounding. Measure voltages between neutral and ground. This value shall not be more than 2 volts. Check for other voltage abnormalities such as floating voltage, etc. Investigate the cause of floating voltage or neutral to ground voltage values exceeding 2 volts. Provide corrective measures in an approved manner and as required.
6. Provide three (3) typewritten copies of the recordings in bound booklets prior to request for final payment.
7. Demonstrate by tests, at the request of the Engineer or the Architect, the compliance of the installation with these specifications, the drawings, the National Electric Code, and the accepted standards of good workmanship. These tests shall include operation of lights and equipment, continuity of the conduit system, grounding resistances, and insulation resistances on not more than ten (10) representative circuits and any other circuits for which a justifiable reason exists for such tests. All labor and testing equipment for the performance of these tests shall be furnished by the contractor.
8. All SPD units installed shall be tested prior to installation. Provide test results in test reports.

3.13 CUTTING AND PATCHING:

A. Contractor shall include all cutting and patching of masonry, concrete, sheet metal or iron work belonging to the construction which must be done in order that the electrical work may be properly installed. Disturbed construction or finish must be replaced or "patched-to-match." to the Architect's satisfaction. Under no condition shall structural work be cut except upon review of the Architect.

B. Cutting through floors, walls, and partitions is to be avoided and only where indicated on drawings and where necessary will same be permitted. When it is necessary, cutting shall be done with a power drill in a careful manner and openings filled as directed.

3.14 DAMAGE:

A. Contractor shall be responsible for all damage caused by this work. All costs for patching, replacement or repairing shall be included in the contract.

3.15 PROVISIONS FOR LATER INSTALLATION:

A. Where any electrical work cannot be installed as the structure is being erected, provide and arrange for the building-in of boxes, sleeves, inserts, fixtures, or devices necessary to permit installation of the omitted work during later phase of construction. Arrange for any lay-out, chases, holes, or other openings which must be provided in masonry, concrete or other work.

3.16 CONCRETE WORK:

A. Concrete work required in the electrical contract shall be provided as indicated on drawings or in the specifications.

B. Provide 3" high concrete curb with sloped top around all exposed conduits passing through floor and under all floor mounted electrical equipment.

3.17 STRUCTURAL DIFFICULTIES:

A. Should any structural difficulties prevent the installation of any electrical work at points shown on the drawings, minor deviations therefrom, as approved by the Architect, may be permitted and must be made without additional cost.

3.18 UNIT PRICES:

A. Submit as requested an "Electrical Work - Unit Price Schedule:"
   1. Changes in electrical plans showing relocations or rearrangements which do not add to the amount of materials required shall not be subject to extra cost.
   2. Only the net quantity of material added to or deducted from the job shall be figured in the unit-priced extras or deductions. For instance, if a conduit run is lengthened, only the number of feet (to the nearest 10' length) added are to be computed in the extra.
   3. Provide a complete fixture schedule list with a unit price for each luminaire listed in the schedule for add/deduct price. The unit price for each luminaire shall include the cost of furnishing and installing the luminaire.

B. These unit prices shall be the basis upon which the additions to and deductions from the contract shall be computed. Any part of the additional work which is covered by unit prices shall be so figured even though other items may be figured by other methods.

C. Unit prices shall govern during the life of the contract.

3.19 RETURN AIR PLENUM:

A. All electrical work to be installed in return air plenum shall be installed in full compliance with national, federal, state and local codes . All lighting fixtures (whether scheduled or not) shall be approved for such use as the installation requires.

3.20 TEMPERATURE CONTROL SYSTEM WIRING:

A. All work related to "temperature control" shall be by others unless specifically noted on the plans or in the specifications.

B. Provide all necessary 120 volt power to temperature control panels as required. Verify all locations and requirements with mechanical contractor.

C. Electric heating equipment with built-in or remote thermostats. shall be furnished, installed and wired complete by electrical contractor.

3.21 DEFINITIONS:

A. Wherever the term "--this ELECTRICAL DIVISION--" is used, such term means this DIVISION 16 and includes every section in DIVISION 16.

B. Wherever the term "--provide--" is used, such term means that the electrical trade shall furnish and install the subject equipment and/or material, or both.

C. Whenever the term "--install--" is used, such term means that the electrical trade shall install only the subject equipment and/or material, or both.

D. Wherever the term "--furnish--" is used, such term means that the electrical trade shall furnish only the subject equipment and/or material.

3.22 RELATED WORK SPECIFIED ELSEWHERE:

A. Openings: Wall, floor, ceiling and roof openings specifically shown and identified on the architectural and structural drawings are to be provided under other DIVISIONS if proper information is furnished on Schedule by this ELECTRICAL DIVISION. Openings not so identified are to be part of this ELECTRICAL DIVISION.

B. Roof Sleeves: Roof sleeves furnished and installed under this ELECTRICAL DIVISION are to be incorporated into the finished roofing and made weathertight under another DIVISION. Contractor shall maintain any current roof warranties by following the manufacturer's requirements.

C. Painting: Painting of all exposed-to-view conduit, pipes, ducts, hangers, supports and equipment, insulated or not, both in finished and unfinished areas, will be performed under another DIVISION. Under this ELECTRICAL DIVISION, furnish all manufactured equipment in factory-finished baked enamel, unless otherwise specified.

D. Cellular Metal Floor Raceways: A complete preset cellular metal floor raceway system is being furnished under THE GENERAL TRADES WORK 50. Activating kits are to be furnished to this contractor for installing and activating the presets where shown on the drawings. The contractor shall return all unused kits to the Owner. The wireway for the connection from the floor system to the panelboards is to be furnished under The General Trades Work, and is to be installed as part of the work of this section.

E. Equipment Furnished by Others: Equipment furnished by other DIVISIONS and requiring electrical supply is to be erected, aligned, leveled and prepared for operation by other DIVISIONS. That DIVISION will also provide required controls and accessories along with installation instructions, diagrams, dimensions and supervision of installation and start-up. Under this ELECTRICAL DIVISION, provide the required electrical rough-ins and verify the electrical controls and accessories furnished under the specifications for the other DIVISIONS. Install those controls and accessories not located in the MECHANICAL piping and ductwork. Provide additional electrical controls, accessories, fittings and devices not specified under the equipment but required for a finished, operating job. Make all final electrical connections. Participate in the start-up and test procedure.

3.23 SUPERVISION:

A. Provide a job superintendent or foreman acceptable to the Architect to be on the job at all times during its progress with authority to act for the contractor (or subcontractor) and to supervise the installation of the work and to consult with other trades as to the proper execution and conduct of the work so that same may be carried on as rapidly as possible and in cooperation with other work that may be going on at the building at such time.

3.24 GUARANTEE:

A. Guarantee contract for a period of one (1) year from the date of acceptance. This guarantee shall include labor and material to repair or replace any defective item or portion of work as indicated in this specification and as shown on the plans. Such repairs and/or replacement shall be done immediately, at no additional cost.

END OF SECTION 16050

DIVISION 16051

WORK IN EXISTING BUILDING

PART 1 - GENERAL

1.1 SCOPE:

A. Perform all work in existing building as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes.

B. Material and equipment shall be new and shall conform to the NEMA, Underwriters' Laboratories, Inc., ANSI, and IEEE Standards, where applicable standards have been established.

PART 2 - REQUIREMENTS

2.1 REVISIONS TO EXISTING BUILDING:

A. Electrical contractor shall note the revisions to the existing building and revise the existing systems affected complete as required. Note the existing systems affected complete as required. Note the new equipment, conduit, etc., which is indicated to be provided in the existing building, including any work which is to be provided there to serve equipment in the new building. Survey the premises thoroughly and include in base bid, all work necessary for the completion of all electrical work in the existing building, including cutting and patching. Verify, during the bidding period, the feasibility of the indicated locations of new and relocated equipment and the feasibility of all conduit routes. Where other conduit routes and equipment locations are necessary, submit them with the bid.

B. Maintain electrical service to all existing areas not being remodeled. Maintain continuity of wiring for any communication or alarm system where the remodeling work breaks the continuity. The above maintenance shall be for the entire period of construction.

C. All work shall be done with a minimum of interruption to existing services and functions.

D. Permission shall be obtained in writing, from the Owner, before any interruptions of service .

E. In areas where alterations are being made and existing outlets are not retained, outlets and wiring shall be removed. Lighting fixtures and electrical equipment in these areas, which are affected by the alterations, shall be disconnected and removed. Where new lighting only is shown, the receptacle outlets generally will be retained.

F. All fixtures and equipment being removed and not relocated shall remain the property of the Owner and shall be turned over to the Owner and/or stored on the premises at the place directed in the field or abandoned and removed from site as directed.

G. Wire and conduit removed shall become the property of the electrical contractor and shall be removed from the premises.

H. Where existing outlets are removed, the wires shall be removed to the last outlet or junction box retained. Boxes shall be retained only if they remain accessible. Abandoned exposed conduit runs shall be removed except as otherwise directed.

I. Where ceilings are taken down and reinstalled, as where ducts, pipes, etc., are installed in, and/or removed from spaces above ceilings, the electrical contractor shall disconnect and remove the lighting fixtures and/or other electrical equipment/devices as required. Reinstall and reconnect the fixtures and/or equipment/devices at the proper time, coordinating this work with that of other trades involved. Where ceilings must be taken down because of electrical work, the electrical contractor shall do this work and shall also include the removal and reinstalling of the ceiling.

J. In both new and existing construction, except in wire closets and unfinished Mechanical Equipment Rooms, outlets shall be flush with the finished wall or ceiling and conduits shall be concealed. For two (2) wire extensions in existing plaster, steel oval duct may be used. If a new suspended ceiling is installed, conduit shall be installed as for new construction and necessary wiring shall be done for existing work remaining in use. Where acoustical material will be applied to the existing ceiling, necessary box extensions shall be provided on existing outlets.

K. Where removal of existing wiring results in the loss of service to outlets or lighting which are not to be removed or abandoned, the circuits shall be reconnected to restore service to these outlets or lighting. Where an existing panelboard is relocated or removed, all existing branch circuits and feeders associated with relocated/removed panel shall be rerouted to the new location off relocated/new panelboard and connected as required. Temporary service shall be provided as required.

L. Refer to the drawings and to other portions of these electrical work specifications for special items regarding the existing installation and for items to be located in the existing building or required conduit, etc., to be provided in the existing building. The requirements of this section shall apply to all such work.

END OF SECTION 16051

DIVISION 16110

RACEWAYS

PART 1 - GENERAL

1.1 SCOPE:

A. Provide raceways as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes for application, size, location and installation of each type of raceway used.

B. Metal Conduit and Tubing: Provide conduit and tubing in conformance with the following standards:
   1. Rigid steel conduit zinc coated shall conform to American National Standards Institute (ANSI) C80.2, "Rigid and Steel Conduit."
   2. Electrical metallic tubing (EMT), zinc coated shall conform to American National Standards Institute (ANSI) C80.3, "Electrical Metallic Tubing - Zinc Coated."
   3. PVC externally coated galvanized rigid steel conduit and intermediate metal conduit shall conform to National Electrical Manufacturers Association (NEMA) RN1, "Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit."
   4. Flexible metal electrical conduit shall conform to UL 1, "Flexible Metal Conduit."
   5. Liquid-tight flexible steel conduit shall conform to UL 360, "Liquid-Tight Flexible."
   6. Intermediate metal conduit (IMC) shall conform to Underwriters Laboratories, Inc. (UL) 1242, "Intermediate Metal Conduit."

C. Wireways, Auxiliary Gutters and Associated Fittings: Provide in conformance with ANSI 870, "Wireways, Auxiliary Gutters, and Associated Fittings."

D. Surface Metal Raceways and Fittings: Provide in conformance with UL 5, "Surface Metal Raceways and Fittings."

E. Metal and Plastic Conduit and Raceway Fittings:
   1. Fittings for conduit and outlet boxes shall conform to UL 514B, "Fittings for Conduit and Outlet Boxes."
   2. Outlet boxes and fittings for use in hazardous (classified) locations shall conform to UL 886, "Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations."
   3. PVC fittings for use with rigid PVC conduit and tubing shall conform to NEMA TC 3, "PVC Fittings for Use With Rigid PVC Conduit and Tubing."
   4. Surface metal electrical raceways and fittings shall conform to UL 5.

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050 -1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 CONDUIT:

A. All conduit shall be rigidly supported to structure with appropriate supports.

B. All conduit shall be installed in a neat, accurate manner and shall emerge from floors, concrete surfaces and ceilings at right angles thereto.

C. Install exposed conduits parallel to or at right angles with the lines of the building and structures. Make bends with standard conduit ells or field bend conduit in accordance with NEC Tables. All bends shall be free from dents or flattening. Do not use more than the equivalent of three 90 degree bends in any run between cabinets, outlets and junction or pullboxes.

D. Conduits shall be continuous from outlet to outlet and from outlets to cabinets, junction or pullboxes and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous from point of service to all outlets. Terminate all conduits with two (2) locknuts and bushings. Joints shall be cut square, reamed smooth and drawn up tight. Plug the ends of each conduit to prevent the entrance of foreign materials when exposed during construction. Conduit systems shall be completely cleaned before conductors are installed.

E. Securely support all conduit and electrical metallic tubing at intervals not exceeding 8'. Straps shall be one (1) hole malleable type. Support single conduit runs with rod hangers securely anchored to structure. Support groups of conduit with rod hangers and galvanized racks. Do not use perforated straps, wire, etc., for supporting conduit. Conduit shall not be suspended from or fastened to work of mechanical trades or from roof deck.

F. Electrical work shall not impair the structural strength of the building. Do not install an excessive amount of conduit in structural members, place sleeves at stress points, etc. American Concrete Institute Standard 318-71, Paragraph 6.3, shall govern placement of conduit in concrete construction.

G. Wires shall be installed in conduit, including control and grounding wires, unless indicated otherwise. Where the term "wiring" is used in the specifications or on the drawings, it shall be understood that conduit (or other indicated type raceway) shall be provided.

H. Conduit shall not be routed in the masonry void between CMU and face brick without written approval of the Architect/Engineer and written confirmation of the continuous insulation not being affected.

I. Minimum conduit size shall be 3/4" except for three (3) wires or less or control wiring within building, which may be 1/2" conduit.

J. Electric Metallic Tubing (EMT) shall be installed in the following locations:
   1. Concealed in ceiling cavities.
   2. Concealed in interior partitions.
   3. Maximum allowed trade size for EMT is 2" unless otherwise noted.
   4. Do not bury in ground or in slabs on grade.
   5. Do not use in concrete where vibrators are to be used in its placement.

K. Rigid heavy wall or IMC, galvanized steel conduit shall be installed in the following locations:
   1. For direct burial in or below concrete floor slabs or grade. Field coat with asphalt before installation.
   2. Encased in concrete. Field coat with asphalt before installation.
   3. Exposed to weather.
   4. Where conduits larger than 2" are to be installed.
   5. Where physical damage is possible (generally all exposed work above finished concrete floor slab or encasement).
   6. Provide chromium plated where exposed in food handling facilities and other locations where pipes are chromium plated.

L. PVC Externally Coated Galvanized Rigid Steel and Intermediate Metal Conduit:
   1. May be used for direct burial in ground and in slabs on grade.
   2. Use in corrosive environments.

M. Flexible Metal Electrical Conduit:
   1. Use in dry location, maximum 6’ – 0” lengths.
   2. Do not use in corrosive atmosphere, exterior locations, damp or wet locations.

3. Use to connect motors, transformers and recessed ceiling fixture, wherever equipment must be isolated or shifted to its final position.
4. Use where conduit must be fished in building voids.

N. Liquid-Tight Flexible Steel Conduit:
1. Use for exterior locations, maximum 6' – 0" lengths.
2. Sizes 1-1/4-inch and smaller, provide with a continuous copper bonding conductor wound spirally between convolutions.
3. Sizes 1-1/2-inch and larger, provide with an internal grounding conductor and grounding bushings.

O. Wireways, Auxiliary Gutters:
1. May be used to facilitate installation and future changes in wiring between panelboards, safety switches in close proximity to each other on same or adjacent walls or in same electrical equipment room or area.
2. Provide weatherproof enclosure where outdoors or subject to moisture and similar elements.
3. Use where shown on drawings or specified.
4. Shall be completely accessible.

P. Surface Metal Raceways and Multi-Outlet Assembly:
1. Do not use where subject to physical damage or wet locations.
2. Use only where shown on drawings or specified.
3. Provide continuous ground conductor.

Q. Raceway Fittings, Couplings and Connectors:
1. Use fittings listed and approved for specific conduit or raceway system used; (e.g.: Use PVC coated fittings with PVC coated conduit).
2. For threaded rigid steel conduit do not use threadless or compression type fittings.
3. For EMT, provide steel or malleable iron "concrete-tight" or "rain-tight" couplings and connectors, compression, set screw or stainless steel multiple locking type. Do not use indentation type of fitting.
4. Bushing and connectors shall be insulated type which maintain continuity of conduit grounding system. Insulating material shall be molded or locked into metallic body of the fitting. Bushing made entirely of nonmetallic material will not be allowed.
5. Set screw connectors and couplings body shall have wall thickness at least equal to wall thickness of conduit used. Couplings or conduit trade size 1/2 through 2-inch shall have two set screws per fitting and 2-1/2 through 4-inch shall have four set screws per fitting. Set screws shall be case hardened steel with hex head and cup point.
6. Provide flexible metal conduit fittings made of steel or malleable iron. They shall be insulated and one of the following types:
   a. Wedge and screw type having an angular wedge fitting between the convolutions of the conduit.
   b. Squeeze or clamp type having a bearing surface contoured to wrap around the conduit and clamped by one or more screws.
   c. Steel, multiple point type, for threading into internal wall of the conduit convolutions.
7. Liquid-tight flexible metal conduit shall incorporate a threaded grounding cone, a steel, nylon or equal plastic compression ring and a gland for tightening. Fitting shall be steel, or malleable iron with insulated throat, with male thread and locknut or male bushing with or without "O" ring seal.
8. Provide expansion fittings for all rigidly fastened conduits spanning a building expansion joint and if not otherwise provided, for all runs 1-1/2-inch or larger, exceeding 150 feet in length. Fittings shall be hot-dipped galvanized malleable iron with a packing ring to prevent entrance of water, a pressure ring, a grounding ring and a separate external copper bonding jumper.
9. Inferior material such as "pot metal" shall not be used for any type of fitting.
10. All locknuts shall be the bonding type with sharp edges for digging into the metal wall of an enclosure.

R. Heavy wall conduit shall be hot dipped galvanized. Thinwall and IMC conduit shall be hot dipped galvanized on the outer surface and shall be enameled on the inner surface. Conduit shall be manufactured by Allied Tube and Conduit Corporation, Triangle Conduit and Cable Corporation, Wheatland Tube Company or equal.

S. Conduit shall be installed concealed wherever possible, except as otherwise indicated. In unfinished Mechanical Equipment Rooms where exact locations or ventilation ducts, etc., are not known, install the conduit exposed and avoid interference with such equipment. Utilize Wiremold surface raceway in finished areas where concealment is impossible.

T. Fittings for rigid conduit shall be malleable iron shall be supplied with covers having captive stainless steel screws, shall have tapered threaded hubs and shall conform to UL Standard #514. Each hub shall have smooth, rounded integral bushing, free from burrs and sharp edges which could damage conductor insulation. Unused hub openings shall be tightly closed with threaded close-up plugs. In moist or outdoor areas, the fitting covers shall have gaskets to provide weatherproof installation. Conduit fittings of Type C and LB for 1-1/4" conduit and larger shall have built-in rollers when conductors of Size #3 AWG and larger are installed and shall be Crouse Hinds #LBD 4400 Series or equal.

U. Flexible connections shall generally be made with UL listed flexible metallic conduit. All connections to motors and in areas where such connections will be exposed to oil, grease, water or weather, the conduit shall be liquid-tight type. Anaconda Type UA Sealtite, Electriflex Liquatite, Crouse-Hinds Type LTB or equal. In no instance will the use of BX cable be permitted. For flexible metallic conduit, fittings shall be steel with nylon angular wedge fittings between the convolutions of the conduit, similar to T & B 3110 Series. For liquid-tight conduit, fittings shall be steel with nylon compression ring and a grounding cone with nylon insulated throat; for connections at unthreaded opening, provide an "O" type sealing ring of single piece design with Buna-N sealing material. The flexible metallic conduit shall be considered as a grounding means when no longer than 6 feet and where both the conduit and fittings are UL listed for grounding.

V. Installation of conduits in concrete shall conform with the following:
   1. In certain types of slab construction, generally those with a very thin slab, no conduits will be permitted.
   2. Coordinate the work for installation of conduits in slabs with the general construction work. Establish a time for installation that will minimize danger of damage to the conduits.
   3. Conduits larger than 1" nominal diameter shall not be installed in a slab except where shown on the drawings or as directed by the Owner's Representative.
   4. In slabs, conduits shall be located in the middle 1/3 of the slab thickness. The outside diameter of the conduit shall not exceed 1/3 the thickness of the slab. As the minimum conduit size is 3/4", no conduits may be installed in slabs of less than 3" thickness.
   5. Use conduit under floor slab on grade when outside diameter of conduit exceeds one-third of the slab thickness. Encase conduit in concrete having a minimum coverage 2" all around and between conduits. Concrete shall be a minimum 3,000 psi air entrained ready-mixed concrete conforming to ASTM C94. Pour concrete from one end to the other end, never from both ends to the center.
   6. Conduits shall not be spaced closer than three (3) diameters on center. Conduits which pass vertically through a slab shall also have a minimum spacing of three (3) diameters on center.
   7. Conduits shall cross in slabs only where permitted by the Owner's representative and in no case shall cross at an angle of less than 45°.
   8. Conduits shall not pass through beams unless so noted and as reviewed by Owner's Representative.

W. Additional corrosion protection shall be provided where all galvanized conduit and sleeves enter or exit concrete. Conduit shall be thoroughly coated with two (2) coats of an approved asphaltic paint, at least 6" into the concrete and 6" after exiting the concrete.

X. Expansion fittings shall be provided at expansion joints or in exposed conduits runs over 125' in length and shall be O.Z. Type EX or AX or equal. Underwriters' listed bonding jumpers shall be provided where required.

Y. Running threads shall not be used. Where conduits with tapered threads cannot be coupled with standard conduit couplings, O.Z. or T & B split couplings or Raco 1502 three (3) piece couplings shall be used. Installation in concrete shall be concrete-tight.

Z. Insulated throat bushings shall be used with conduit sizes 1-1/4" and larger and/or with cable sizes #4 and larger. For rigid conduit, they shall be equal to O.Z. B type with body, threads, and conduit stop all made of malleable iron or steel and with phenolic insulation. For thinwall conduit, the bushings shall be Type SBT. Provide grounding bushings where required.

AA. Conduit seals (factory made fittings) shall be provided where conduits enter an area which at any time is at a low or high temperature. Crouse Hinds #EYS21 or equal.

BB. When penetrations of fire rated floors and/or walls are made, the spaces around the wires shall be sealed to prevent the spread of smoke, fire, toxic gas or water through the penetration neither before, during, or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electric Code.

1. Sealant shall remain soft and pliable to allow for the removal and/or addition of cables without the necessity of drilling holes. It shall adhere to itself perfectly to allow any repairs to be made with the same material. It shall be capable of being installed by a single tradesman, working from one side of a floor or wall.
2. When sealant is injected into a penetration, it shall expand to surround items within the penetration and maintain pressure against the walls of the penetration.
3. Sealant shall meet fire test and hose stream test requirements of ASTM E119-73 and shall be UL classified as a wall opening protective device. Sealant shall be 3M Fire Barrier 2001 Silicone RTV Foam or equal.

2.2 SURFACE MOUNTED RACEWAY:

A. All wireways which are to be surface mounted on finished room surfaces shall be Wiremold or approved equal.

B. Minimum Wiremold size to be #2000 unless noted otherwise on the drawing.

C. Surface raceway installations shall be complete with proper fittings and all appurtenances. Entire system shall be securely anchored in an approved manner. All runs shall be straight and parallel or perpendicular to wall and ceiling surfaces.

END OF SECTION 16110

DIVISION 16120

WIRES AND CABLES

PART 1 - GENERAL

1.1 SCOPE:

A. Provide wires and cables as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes for application, size, location and installation of each type of wire and cable.

B. American Society for Testing and Materials (ASTM): Comply with requirements of the following:
   1. B 1 - Standard Specification for Hard-Drawn Copper Wire
   2. B 2 - Standard Specification for Medium-Hard-Drawn Copper Wire
   3. B 3 - Standard Specification for Soft or Annealed Copper Wire
   4. B 8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
   5. D 753 - Standard Specification for General Purpose Polychloroprene Jacket for Wire and Cable.

C. Electrical Testing Laboratories (ETL): Provide wiring, cabling and connector products which are ETL listed and labeled.

D. Institute of Electrical and Electronics Engineers (IEEE): Comply with the following standards which apply to wiring systems:
   1. 82 - Test Procedure for Impulse Voltage Tests on Insulated Conductors
   2. 241 - Recommended Practice for Electric Power Systems in Commercial Buildings

E. NFPA: Comply with NFPA 70 requirements for construction, installation and color coding of electrical wire, cable and connections.

F. National Electrical Manufacturers Association (NEMA): Comply with requirements of the following:
   1. WC 3 - Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
   2. WC 5 - Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
   3. WC 7 - Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
   4. WC 8 - Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

G. UL: Provide material conforming to the following standards:
   1. 4 - Armored Cable
   2. 44 - Rubber-Insulated Wires and Cables
   3. 83 - Thermoplastic-Insulated Wires and Cables
   4. 486A - Wire Connectors and Soldering Lugs for Use with Copper Conductors
   5. 854 - Service-Entrance Cables

H. UL Labels: Provide wiring, cabling and connector products which are UL listed and labeled.

I. Materials and equipment shall be new and shall conform to NEMA, Underwriters Laboratories, Inc., ANSI, and IEEE Standards where applicable standards have been established.

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050-1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 MANUFACTURERS:

A. Encore
B. Rome
C. Superior Essex
D. Southwire

2.2 WIRES:

A. Electrical distribution (feeders and panelboard circuits) wires shall be in accordance with the contract documents. Note any special applications specified in other electric work.

B. Voltage Drop:
   1. It is intended that the voltage drop shall not exceed 3 percent from the branch panel to the last outlet.
   2. Wire not smaller than #12 AWG shall be used on 2 or 3 wire 120/208 volt branch circuits up to 75' length of run and not less than #10 AWG shall be used up to 120' length, except circuits exceeding 1500 watts at 120V shall be wired with not less than #10 AWG, or as denoted on drawings.
   3. For 277V, 20 ampere circuits the maximum circuit length for #12 AWG is 170' and #10 AWG shall be used for 20 ampere circuits longer than 170' up to 250', thence use #8 for longer circuits, or as denoted on drawings.

C. Harmonics:
   1. Where a shared neutral conductor for a 208Y/120V system (for non-linear loads) must be used for multiple phases, use a neutral conductor having at least 173% ampacity of the phase conductors.

D. Wire shall be copper with "THWN/THHN" insulation, rated at 600 volts, unless otherwise indicated.

E. Wire within fluorescent channels shall be listed for such use.

F. It is acceptable to use stranded wiring in building power wiring applications.

G. Wire shall have factory color-coded covering in accordance with code requirements and shall be installed with wires of the same phase being of one (1) color.
   1. 208/120 Volt System: Phase A-Black, B-Red, C-Blue.
   2. 480/277 Volt System: Phase A-Brown, B-Orange, C-Yellow.
   3. Neutral wires shall be White for 208Y/120V.
   4. Neutral wires shall be Gray or White with colored (other than green) tracer for 480/277 volt.
   5. Green shall be used for grounding only.
   6. 3-way and 4-way switch travelers and control wires shall have distinctive colors.

H. The use of aluminum conductors is prohibited.

I. The use of non-metallic sheathed cable type NM or NMC, armored-bushed cable (BX) and armor clad cable (AC) is prohibited.

J. No wires smaller than #12 shall be used except where specifically indicated otherwise. Wires and cables shall be of sufficient size and capacity to guarantee minimum allowable voltage drop.

2.3 CONNECTORS AND SPLICES:

A. General: Provide UL listed metal connectors of sizes, ampacity, temperature ratings, materials, and classes required by NFPA 70 and NEMA standards for applications and services indicated.

B. Branch Circuits: For wires No. 10 AWG and smaller, provide solderless, insulated pressure cable type connectors, 600V, of the compression or indent type or wire nut connectors. Temperature rating of connectors shall be at least equal to that of the wire on which they are used.

C. Copper Conductors: For No. 8 AWG and larger wire, provide socket head cap, hex screw, or bolt clamp type connectors, manufactured of high conductivity copper alloy or bronze castings. Select proper connector for each wire size. Cable sizes 250 MCM and larger shall be retained in the connector by twin clamping elements.

2.4 INSULATING TAPE, PUTTY, RESIN AND SUPPORTS:

A. Tape: Provide plastic electrical insulating tape which is flame retardant, cold and weather resistant. Tape for use in areas subject to temperatures 30° C. to 105° C., or where the tape will be subjected to an oil splash, tape shall have a minimum thickness of 8.5 mils, and shall consist of an oil-resistant vinyl backing with an oil-resistant acrylic adhesive.

B. Materials: Provide insulating materials for splices and connections such as glass and synthetic tapes, putties, resins, splice cases, or compositions of the type approved for the particular use, location, voltage and temperature, and apply and install in an approved manner, in accordance with the manufacturer's recommendations.

C. Supports: Provide cable supports of the wedge type which firmly clamp each individual cable and tighten due to the cable weight.

2.5 WIRE AND CABLE INSTALLATION:

A. During the installation period and until the work is finally accepted, adequately protect from damage all wire and cable installed. In the event of injury to wire or cable due to negligence by the contractor, the damaged cable or wire shall be repaired or replaced at no additional cost.

B. Conductors shall be carefully handled during installation to avoid damage of any kind. Unreeling and coiling shall be done slowly in order to prevent damage to the insulation or sheath. Repeated bending shall be avoided, and the manufacturer's recommended minimum bending radius shall be observed.

C. Wire and cable shall be pulled into raceways with a minimum number of changes in direction. Cable-pulling tensions shall not exceed manufacturer's recommended values. Only cable lubricants approved for the type of jacket material or insulation shall be used.

D. Each conduit shall be free of moisture and debris before conductors are installed. Remove moisture from conduits by swabbing. Check conduit after 72 hours for any new moisture. If new moisture is present, correct conduit installation to be watertight and swab and recheck in 72 hours. Repeat process as necessary.

E. Wire and cable manufactured more than 12 months prior to date of delivery to the site shall not be used.

F. Feeders and motor branch circuit wiring shall be installed in continuous lengths. Splicing of conductors will not be permitted. Obtain written approval from the Owner prior to splicing conductors, if warranted by working conditions.

G. Limit the number of conductors in boxes in accordance with NEC Table 370-16.

H. Provide separate grounding conductor in each "home run." Ground to ground bar in panel.

I. Wire and cable shall be derated in accordance with NEC when the number of current carrying conductors exceeds three (3) in a raceway.

2.6 FISH WIRE:

A. Each length of conduit which is to be used for the communications systems shall contain a #14 gauge nylon fish wire.

B. Conduits which are left empty shall contain fish wire of such a gauge required to pull in wire or cable to fill the conduit as determined by code.

C. Terminations of all empty conduits shall be properly tagged.

2.7 GROUNDING SYSTEM:

A. A complete grounding system with all accessories and appurtenances shall be provided as required and specified. The entire system shall be in accord with applicable standards of the ANSI, IEEE, and NEC federal and local governing codes.

B. Electrical system neutrals and ground bus bars, as well as all non-current carrying metal parts of the electrical wiring system, shall be grounded. All major equipment frames shall be grounded.

C. In general, conduit connections to outlets, junction boxes, pull boxes, cabinets, and motor starting equipment shall have sufficient ground connection. Draw up conduit connections tight and secure to ensure proper continuity throughout the conduit system.

D. At all wet locations, or as denoted on the drawings, provide a separate grounding wire for all devices and equipment required by code.

E. Grounding conductors shall be copper 600 volt insulated bare, or bus bar as indicated. Insulated wires shall be Type THW or THHN/THWN. Connections to ground rods shall be made by Thermit Welding.

F. Motor frames and control enclosures shall be considered grounding through associated metallic conduit connections, but grounding jumpers shall be provided where necessary to assure effective grounding, particularly across flexible connections.

G. Interior metal piping systems that may become energized shall be properly bonded.

END OF SECTION 16120

DIVISION 16130

BOXES

PART 1 - GENERAL

1.1 SCOPE:

A. Provide boxes as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes.

B. National Electrical Manufacturers Association (NEMA):
   1. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports, for sheet-steel outlet boxes, devices boxes, covers and box supports.
   2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies, for fittings, cast metal boxes and conduit bodies.

C. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code," for construction and installation of electrical wiring boxes and fittings.

D. Underwriters Laboratories, Inc. (UL): Provide electrical boxes and fittings which are UL-listed and labeled, and conform to:
   1. UL 50 - Cabinets and Boxes
   2. UL 514A - Metallic Outlet Boxes
   3. UL 514B - Fittings for Conduit and Outlet Boxes
   4. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
   5. UL 886 - Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050-1.04.

PART 2PART 2 - PRODUCTS AND EXECUTION

2.1 MANUFACTURERS:

A. Appleton

B. Raco

C. Steel City

2.2 FABRICATED MATERIALS:

A. Interior Outlet Boxes: Provide minimum 4-inch square by 1-1/2" deep, one piece, deep-drawn, galvanized steel, outlet boxes for general use. Provide 4-inch octagonal concrete boxes and hung ceiling boxes of the folded or welded type where required by project conditions. Provide square cornered, straight sided gang boxes wherever required by NFPA 70 or more than two wiring devices are indicated in the same location. Provide boxes of increased depth where required by the project.
   1. Construct with stamped knockouts in the back and sides.
   2. Provide threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.

B. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including plaster covers, 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.

C. Weatherproof Outlet Boxes: Provide corrosion-resistant cast-metal weatherproof outlet 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.

D. Junction and Pull Boxes: Provide galvanized sheet steel junction and pull boxes, with screw-on covers and of types, shapes and sizes, to suit each respective location and installation.
   1. Provide welded seams and stainless steel nuts, bolts, screws and washers.
   2. Conform to the applicable requirements of NFPA 70 and to UL 50 for boxes over 100 cubic inches volume, except as modified below.
   3. Where necessary for boxes to provide a rigid assembly, provide integral structural steel bracing.

E. Floor Boxes: Provide galvanized steel stack floor boxes where indicated, with adjustable conduit knockouts, vertical adjustment rings, gaskets, floor plates and flush hinged or screw-on covers.
   1. Provide means for combination telephone or signal and receptacle outlet use for these boxes where indicated.
   2. Provide multi-section boxes with individual section covers within a common flush floor plate where indicated.

F. Weatherproof: Provide corrosion resistant cast-iron weatherproof adjustable floor boxes where indicated, with threaded-conduit entrances, vertical adjusting rings, gaskets, brass floor plates and flush, screw-on covers.

G. Floor Box Accessories: Provide two-wire, three-pole, flush grounding-type 125 V, 20 A, floor type receptacles with flanges where indicated. Provide duplex receptacles, 125 V, 20 A, recessed mounted within combination boxes where indicated.

H. Floor Box Service Fittings: Provide surface mounted floor box service fittings where indicated.
   1. Fittings shall be 316 stainless steel or aluminum with bright finish.
   2. Except as otherwise indicated provide the horizontal type not over 3" high.
   3. For receptacle fittings provide the duplex grounding type.
   4. For telephone fittings use types approved by the local telephone company.
   5. Signal outlet fittings shall have a one inch bushed side opening.

I. Conduit Bodies: 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.

J. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts, malleable iron conduit bushings and offset connectors of types and sizes to suit respective uses and installation.

K. Boxes for Hazardous Locations: Provide boxes UL listed for the particular type and class of hazard involved.

L. Poke-Through Fittings: Provide electrical fitting of the "poke-through" type in accordance with the requirements of NFPA 70. Fittings shall provide a galvanized steel junction box below the floor slab and a capped 2-inch diameter insert flush with the finished floor slab. The fittings shall provide raceways for both power and communication completely separated from each other. Provide fittings having fire retardant materials of the type which expand in the presence of fire to provide not less than a two hour fire rating.

M. Hazardous Locations: Provide outlet boxes conforming to UL 886 for hazardous locations and install in conformance with NFPA 70 Articles 500 through 555.

PART 3PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS, GENERAL:

A. Coordination: Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work, and with general construction work.

B. Weatherproof: Provide weatherproof outlets for all interior and exterior locations exposed to weather or moisture.

C. Knockout Caps: Provide knockout closures to cap unused knockout holes where blanks have been removed.

D. Anchoring: Support and fasten boxes securely.

E. Sizes: Provide boxes of sizes adequate to meet NFPA 70 volume requirements, but in no case smaller than sizes indicated.

3.2 INSTALLATION OF OUTLET BOXES:

A. Grounding: Provide each box to which a lighting fixture or receptacle is to be attached with a grounding terminal, consisting of either a green-colored washer-in-head machine screw, not smaller than No. 10-32, screwed into a tapped hole or a grounding bushing attached to one of the conduits.

B. Mounting Height: The "mounting height" of a wall-mounted outlet box is defined as the height from the finished floor to the horizontal center line of the cover plate.
   1. Where mounting heights are not indicated or where heights and locations interfere with mechanical, architectural or structural features, install outlet boxes in an approved location, without additional cost.
   2. Where a ceiling outlet and a dropped beam or other change in ceiling level are shown at the same location, place the outlet at least 9" from the finished edge of the beam or change in level, except as otherwise indicated.

C. Device Back Boxes: Shall be mounted recessed in finished where possible, mounting exposed in mechanical rooms is acceptable.

D. Pan Construction: In pan construction, where the normal slab is of insufficient thickness to accommodate the box, thicken the slab to enclose the box completely in concrete.

E. Windows: Locate outlet boxes indicated at windows close to window trim.

F. Doors: For outlets indicated above doors center outlets above the door opening, 6" above the door head, except as otherwise indicated or required.
   1. Locate boxes for switches near doors on the side opposite the hinges as indicated on architectural drawings and close to door trim.

G. Locate outlet boxes for switches and receptacles on columns or pilasters approximately 4" off the centers of the columns to allow for future installation of partitions.

H. Special Finishes: For outlet boxes for receptacles and switches mounted in desks or furniture cabinets or in glazed tile, concrete block, marble, brick, stone or wood walls, use rectangular shaped boxes with square corners and straight sides.
   1. Install boxes without plaster rings.
   2. Saw cut all recesses for outlet boxes in exposed masonry walls.

I. Vertical Axis: Except as otherwise indicated, mount outlet boxes for switches with the long axis vertical.
   1. Mount boxes for receptacles either vertically or horizontally but consistently one way.

2. Three or more gang boxes shall be mounted with the long axis horizontal.
3. Locate boxes, covers or device plates not to span different types of building finishes either vertically or horizontally.

J. Ceilings: For outlets in ceilings where wiring is concealed, use outlet boxes 4" square by 1-1/2" deep, minimum.

K. Prohibited Work:
1. Do not use sectional (gangable) boxes.
2. Do not use device plates as covers for boxes in exposed locations.
3. Do not use 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.

L. Protection: Protect outlet boxes to prevent entrance of plaster, and debris. Thoroughly clean foreign material from boxes before conductors are installed.

M. Threaded Hubs: At the following locations use threaded hub type boxes with gasketed weatherproof covers:
1. Exterior locations.
2. Where installed on unfinished walls, columns or plasters. Cover gaskets may be omitted in dry locations.
3. Where exposed to moisture laden atmosphere.
4. Where indicated.
5. At kitchen and cafeteria equipment with, or within 4' of, steam connections.

N. Deep Boxes: Use extra deep concrete boxes maximum 6", where necessary to permit side conduit entrance without interfering with reinforcing.

O. Floor Boxes: Install floor boxes in concrete floor slabs so they are completely enveloped in concrete except at top.
1. Where normal slab thickness will not envelop box as specified above provide increased thickness of the slabs.
2. Provide each compartment of each floor box with grounding terminal consisting of a green colored washer-in-head machine screw, not smaller than No. 10-32, screwed into a tapped hole in the box.
3. Adjust covers of floor boxes flush with finished floor.

P. Extension Rings: Where extension rings are required on existing outlet boxes, drill new mounting holes in the rings to align with the mounting holes on the existing boxes.

3.3 PULL AND JUNCTION BOXES:

A. Installation: For installation of junction and pull boxes, conform to NFPA 70 and the following:
1. For boxes exposed to rain or installed in wet locations use weatherproof type.
2. For boxes in main feeder conduit runs use sizes not smaller than 8" square by 4" deep.
3. Do not exceed 6 conductors entering and 6 leaving raceways in a single box.
4. Conductors in any pull or junction box including equipment grounding conductors shall not exceed:

Size of Largest Conductors	Maximum No. of Conductors
No. 4/0 AWG	30
250 MCM	20
500 MCM	15
Over 500 MCM	10

B. Supports: Provide in each box, including boxes above switchboards and motor control centers, with sufficient clamps, grids, or devices to which cables are secured in neat and orderly fashion permitting ready identification and so that no cable will have an unsupported length of more than 30".

C. Adjacent Boxes: Locate no box within 2' of any other pull or junction box.

D. Flush Mount: Mount pull boxes concealed in non-accessible walls or ceilings, with the covers flush with the finished wall or ceiling.

E. Low Voltage Connectivity: Unless otherwise indicated provide pull and junction boxes for data, signal and other systems, at least 50 percent larger than would be required by NFPA 70. Locate boxes strategically and provide such shapes as to permit easy pulling of future wires or cables of types normally used in such systems.

END OF SECTION 16130

DIVISION 16140
WIRING DEVICES

PART 1 - GENERAL

1.1 SCOPE:

A. Provide wiring devices as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes.

B. Provide wiring devices conforming to the following:

1. American National Standards Institute (ANSI): Provide plugs and receptacle devices constructed in accordance with ANSI C73, "Attachment Plugs and Receptacles, Dimensions of."
2. Institute of Electrical and Electronics Engineers (IEEE): Construct and install wiring devices in accordance with requirements of IEEE 241, "Recommended Practice for Electric Power Systems in Commercial Buildings."
3. National Electrical Manufacturers Association (NEMA): Provide wiring devices constructed and configured in accordance with the requirements of:
   a. WD 1 - General Requirements for Wiring Devices
   b. WD 2 - Semiconductor Dimmers for Incandescent Lamps
   c. WD 6 - Wiring Devices - Dimensional Requirements
4. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code" as applicable to construction and installation of electrical wiring devices.
5. Underwriters Laboratories, Inc. (Latest UL): Provide wiring devices which are UL listed and comply with the requirements of:
   a. 20 - General-Use Snap Switches
   b. 498 - Attachment Plugs and Receptacles
   c. 943 - Ground-Fault Circuit Interrupters

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050-1.04.

PART 2 - PRODUCTS

2.1 WIRING DEVICES:

A. General: Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and which comply with NEMA WD 1. Provide devices and wall plates of color as selected by Architect except as otherwise indicated; submit color selection.

1. For computer services receptacles, provide orange colored receptacles as dedicated computer service circuits having separate grounds.
2. For duplex receptacles on emergency circuit, provide red receptacles with red baked enamel cover plates and pilot light.

2.2 RECEPTACLES:

A. Duplex Receptacles: Provide specification grade duplex receptacles, 2-pole, 3-wire grounding, with green hexagonal equipment ground screw, pivoted ground system on steel mounting strap, 20 A, 125 V, with metal plaster ears, design for side wiring with four captively held binding screws and provisions for back wiring from four separate metal wiring clamps, with spring loaded, screw activated pressure plate, with NEMA configuration 5-20R unless otherwise indicated.

B. Single Receptacles: Provide specification grade single receptacles, 2-pole, 3-wire, grounding, with green hexagonal equipment ground screw, 20 A, 125 V, with metal plaster ears, design for side and back wiring with spring loaded, screw activated pressure plate, with NEMA configuration 5-20R unless otherwise indicated.

C. Ground Fault Interrupter: Provide termination type ground fault circuit interrupters, with duplex receptacles, capable of protecting connected receptacles on single circuit, and installed in a 2-3/4 inch deep outlet box without adapter. Provide grounding type UL rated Class A, Group 1, rated 20 A, 125 V, 60 Hz; solid-state ground fault sensing and signaling with 5 milliamperes ground fault trip level, equip with NEMA configuration 5-20R.

D. Weatherproof Receptacles: Provide duplex receptacles, 20 A, 125 V, NEMA 5-20R in cast metal box with gasketed, weatherproof cast metal cover plate and gasketed cap over each receptacle opening. Provide cap with spring hinged cover flap.

2.3 SWITCHES:

A. General: Provide specification grade switches as indicated on the drawings conforming to NEMA WD 1 and to the following.

B. Hazardous Locations: Provide switches for hazardous locations that meet all requirements of NFPA 70 for Class [ ], Division [ ], Group(s) [ ]. Provide covers with a finish to match the housing for surface mounted units.

2.4 WIRING DEVICE ACCESSORIES:

A. Wall plates: Provide wall plate for each switch, receptacle, signal and telephone outlet and special purpose outlet. Do not use sectional gang plates. Provide multi-gang outlet plates for multi-gang boxes. Wall plates shall be in accordance with UL 514A, UL 514B, and UL 514C.

1. Material and Finish: Provide [brown] [ ] finish, phenol-resin or urea-resin plates of approved design, in unfinished areas, mechanical spaces, fan rooms, wire closets, transformer rooms, storage rooms, and on walls that are painted. Provide stainless steel or chromium finished plates in lobbies, corridors, special finished areas, toilet rooms, kitchens, or on walls finished with marble, plastics, glazed ceramic interior tile. Provide finishes that are [corrosion-resisting steel (18 percent chromium, 8 percent nickel) with satin finish] [ ]. [Provide nonferrous metal plates of 0.04-inch minimum thickness.] [Provide ferrous plates of 0.03-inch minimum thickness.] Match the finish of fastening screws with the plates. Provide plates for exposed screw jointed fittings that match the fittings with edges of plates flush with edges of fittings and made of heavy cadmium plated steel. Provide plates for cast type boxes at locations subject to wet or rain covers for "push" action type flush switches that are neoprene gasketed.
2. Telephone and Signal Outlets: Provide wall plates for telephone and signal outlets with a 3/8-inch bushed opening in the center. Provide wall plates for push-button and buzzer outlets with openings to suit the push-button and buzzers. Provide material which matches other device plates.

B. Floor Service Outlets: Provide floor service receptacle outlets and fittings of types and ratings indicated. Construct of die cast aluminum, satin finish with 20 A, 125 V, back-to-back gray duplex receptacles NEMA Type 5-20R. Provide with 1-inch NPT, 1-inch long, locking nipple for installation.

C. Poke-Through Assembly Devices: Provide factory assembled poke-through assembly devices, with 20 A, 125 V, single pole, 3-wire, grounding, duplex NEMA Type 5-20R receptacles; capable of maintaining fire floor rating of 3 hours. Construct for installation in concrete floor 3" thick, with center tube, fire-stop wafers, spreader plate, service fitting base plate, and 4-11/16 inch conduit box. Provide floor service fitting base with alignment adjustment screws.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES:

A. General: Install wiring devices as indicated, in accordance with manufacturer's written instructions, applicable requirements of NFPA 70 and NEMA "Standard of Installation," and in accordance with ADA (Americans with Disabilities Act) requirement. Where not indicated, mount switch adjacent to latch jamb of door.

B. Coordination: Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices with other work.

C. Boxes: Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt, and debris.

D. Receptacles: Install receptacles vertically and 18" above the finished floor, unless otherwise noted or specified.

E. Work Sequence: Install wiring devices after wiring work is completed.

F. Connectors and Terminals: Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors". Use properly scaled torque indicating hand tool.

G. Switches: Do not connect switches in the neutral conductor. Install switches indicated with sub-letter to control the lights indicated; however if sub-letter is omitted, install switches to control all lighting. If there is only one switch indicated in the room, install the switch to control all lighting in the room even though they are not indicated by sub-letter. Install switches with centerline located 42' above finished floor unless otherwise indicated by numerals, indicating inches above floor, shown adjacent to letter "a" or by on appropriate note on drawings. Install switches rigidly attached to outlet boxes by means of two screws.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES:

A. General: Upon installation of wall plates and receptacles, advise Owner regarding proper and cautious use of convenience outlets. At time of substantial completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

3.3 GROUNDING:

A. General: Provide equipment grounding connections for wiring devices, unless otherwise indicated. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounds.

3.4 TESTING:

A. General: Test wiring devices for electrical continuity, and for short-circuits prior to energizing circuitry. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements.

END OF SECTION 16140

DIVISION 16170

CIRCUITS AND MOTOR DISCONNECTS

PART 1 - GENERAL

1.1 SCOPE:

A. Provide motor and equipment circuits as shown and specified. Work of this section shall include all accessories and appurtenances necessary for a complete and operating installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes.

B. Materials and equipment shall be new and shall conform to NEMA, Underwriters' Laboratories, Inc., ANSI, and IEEE Standards where applicable standards have been established.

PART 2 - PRODUCTS AND EXECUTION

2.1 MOTORS AND EQUIPMENT CONNECTIONS:

A. Motors and equipment shall be furnished and set in place by others, unless otherwise noted on the drawings or in this specification.

B. Provide all conduit and wire and make all final power connection to all systems: heating, ventilating, air conditioning, plumbing equipment, etc., as required.

C. Provide all conduit and wire and make all final power connections as required to exhaust fans and miscellaneous equipment furnished with motorized backdraft dampers. Dampers shall be connected to equipment 120 volt power circuit so as to interlock the motorized damper with the exhaust fan. For three (3) phase motors, provide an additional 120 volt circuit routed through an auxiliary contact in the motor starter.

D. Final connections to motors shall be made with a flexible conduit, not to exceed 24" in length for conduit 1-1/2" and smaller. For conduit larger than 1-1/2", length may be longer with proper support when approved in writing by the Owner/Engineer to facilitate the removal or adjustment of the motor.

E. Motors and equipment connected through flexible conduits shall have the equipment and motor frames bonded to the rigid conduit system with a separate (green) grounding wire.

2.2 MOTOR STARTERS AND CONTROL EQUIPMENT:

A. Provide all motor-starting and control equipment, complete with properly sized thermal overload protecting elements, not furnished under other sections of the specifications involved. In general, this covers starting and control equipment for fans, pumps, and miscellaneous motors used for building utilities, heating, ventilating, and air conditioning with the exception of certain machines where noted on the drawings which are furnished complete with controls by the vendor. Connect all starters supplied as integral parts of package units. Install and connect all starters furnished under other sections of the specifications.

B. It is the intent that the starting equipment be selected so as to obtain uniformity in quality, appearance, maximum efficiency, and adequate protection for the motors.

C. Except as otherwise noted, provide combination across-the-line type magnetic starters with fused short circuit protection and thermal overloads on each phase. Provide three (3) auxiliary contacts (two (2) N.O. and one (1) N.C.), pilot lights and HOA switch in face of starter.

D. Where a magnetic starter without a line disconnect switch is furnished by others with a motor, provide a suitable fused or unfused safety switch in sight of motor as required.

E. Starters shall be as manufactured by Cutler-Hammer/Westinghouse, Square D, Allen-Bradley. or equal.

F. It shall be the responsibility of the electrical contractor to provide overload heater elements properly sized according to the nameplate full load current rating of the motor (adjusted for ambient conditions) and per starter manufacturer instructions.

G. Circuit breakers feeding heating, ventilation, air conditioning and refrigeration equipment shall be "HACR" type.

2.3 SINGLE PHASE PROTECTION:

A. Provide single phase protection equipment on poly-phase equipment installed as part of contract documents. This equipment shall be provided only where single phase protection is not integral to the starters or controls supplied with the poly-phase equipment. Submit detailed product literature for review.

END OF SECTION 16170

DIVISION 16190

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SCOPE:

A. Provide supporting devices as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the contract documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes.

B. Materials and equipment shall be new and shall conform to NEMA, Underwriters' Laboratories, Inc., ANSI and IEEE Standards where applicable standards have been established.

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050, 1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 PRODUCTS:

A. General: Provide supporting devices with manufacturer's standard materials, designed and constructed in accordance with published product information, for a complete installation and as herein specified.

B. Corrosion Resistance: Provide all supports, support hardware and fasteners hot-dipped galvanized or cadmium plated.

C. For Raceway Supports: Provide manufacturer's standard supports including clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze, wall brackets and spring steel clamps.

D. Fasteners: Provide fasteners of types, sizes and materials indicated with the following construction features:

1. 1/2-inch lead expansion anchors approximately 38 pounds weight per 100 units.
2. 3/16-inch by 4-inch springhead toggle bolts approximately 5 pounds weight per 100 units.

E. Sleeves and Seals: Provide sleeves and seals, of types, sizes and materials indicated with the following features:

1. Provide factory-assembled watertight wall and floor seals, of types and sizes indicated or required suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.

2. Smoke and fire stop seals shall have a UL fire rating of 3 hours where installed in fire rated construction or as indicated. Seals shall be internal (unflanged) type to occupy minimum space.

F. Cable Supports: Provide cable supports in risers as required by the NFPA 70 for non-armored type electrical cables. Furnish cable supports constructed with hot-dipped galvanized cast malleable iron having an insulating liner with tapered surface. Provide an insulating wedging plug for insertion within the support body. Provide pull boxes on conduit risers to contain cable supports.

G. U-Channel Strut Systems: Provide U-channel strut system for mounting and supporting electrical equipment. Fabricate strut from 16-gauge hot-dip galvanized steel sheet, 9/16-inch diameter holes, 8-inches on center on top surface. Fittings shall mate with the U-channel.

H. Lead and Oakum: Caulk between sleeve and pipe where a fire rated seal is not required or specified.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Compliance: Install hangers, sleeves, seals, U-channel supports and fasteners as indicated and in accordance with manufacturer's written instructions. Comply with requirements of NFPA 70 and American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA) for installation of supporting devices.

B. Coordination: Coordinate with other electrical work, including raceway and wiring work.

C. Raceway Supports:

1. Provide raceway support meeting the requirements of these specifications and NFPA 70. Conform to manufacturer's recommendations. For each support provide strength equal to the maximum weight of the present local plus all future raceways for which the support provides space, times a safety factor. Except as otherwise indicated, use a safety factor greater than four where necessary to provide a minimum safety allowance of 200 pounds. Provide additional support strength where required to prevent distortion of raceway during wire pulling.
2. Provide individual and multiple (trapeze) raceway hangers, and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly, and for securing hanger rods and conduits.
3. Arrange for grouping of parallel runs of horizontal raceways to be supported together on trapeze type hangers where possible.
4. Support individual horizontal conduits and EMT 1-1/2-inch size and smaller by either one-hole pipe straps or separate pipe hangers, use separate pipe hangers for larger sizes. Spring steel fasteners may be used in lieu of pipe straps or hangers for sizes 1-1/2-inch and smaller in dry locations. For hanger rods with spring steel fasteners, use 1/4-inch diameter or larger threaded steel. Use steel fasteners that are specifically designed for supporting single conduits or EMT. Unless otherwise indicated, do not use wire as a means of support. Use spring steel conduit supports only for lighting system branch circuit raceway in suspended ceilings in dry locations.
5. Except as otherwise indicated, space supports for metallic and non-metallic raceways in accordance with the requirements of this Section and the requirements of the NFPA 70.
6. Provide support for exposed or concealed raceway as close as practical to and not exceeding one foot from an unsupported box or access fitting. In horizontal runs a support at a box or access fitting may be omitted when the box or access fitting is independently supported and the raceway termination is not made with a close nipple or threadless box connector.
7. In vertical runs provide such support that the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports, with no weight load on raceway terminations or conductor terminals.

D. Miscellaneous Supports:
   1. Provide supports for all miscellaneous electrical components as required to produce the same safety allowances as specified for raceway supports above. Provide metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes etc.
   2. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type fastener not more than 24 inches from the box. When penetrating reinforced-concrete members, avoid cutting any reinforcing steel.

E. Cable Supports:
   1. Install in strict compliance with manufacturer's instructions.
   2. Spacing not to exceed NFPA 70 tabulation for spacing of conductor supports.
   3. Allow adequate slack in conductors to prevent any stress on terminations. Take into consideration conductor thermal contraction.

F. Fasteners:
   1. Unless otherwise indicated securely fasten all electrical items and their supporting hardware including, but not limited to, conduits, raceways, cables, cable trays, busways, cabinets, panelboards, wall-mounted transformers, boxes, disconnect switches and control components to the building structure.
   2. Fasten by means of wood screws or screw-type nails on wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; by machine screws; welded threaded studs, or spring-tension clamps on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts or machine or wood screws. Do not weld conduits or pipe straps to steel structures. In partitions of light steel construction use sheet metal screws.
   3. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams or to a depth of more than 3/4-inch in concrete joints shall not cut the main reinforcing bars. Fill holes that are not used.
   4. Loads applied to any fastener shall not exceed one-fifth of the proof test load. Use vibration and shock-resistant fasteners

G. Sleeves and Seals:
   1. Tighten sleeve seal nuts until sealing grommets have expanded to form watertight and smoketight seal.
   2. Sleeves: Where installed in existing slabs or partitions completely fill the void between the sleeve and masonry with expanding cement grout.

END OF SECTION 16190

DIVISION 16440

DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE:

A. Provide disconnect switches as indicated on the drawings and schedules.

1.2 CONDITIONS OF CONTRACT:

A. All work shall be in accordance with the terms and conditions of the contract documents.

1.3 STANDARDS:

A. All work shall comply with national, federal and local electrical codes.

B. National Electrical Manufacturers Association (NEMA): Provide switches conforming to NEMA KS 1, "Enclosed Switches."

C. NEMA: Construct enclosures conforming to NEMA 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)."

D. Underwriters Laboratories, Inc. (UL): Manufacture switches conforming to the requirements of UL 98, "Enclosed and Dead-Front Switches."
   1. Provide switches listed and labeled by UL.
   2. Provide fuse holders conforming to UL 512, "Fuseholders."
   3. Provide cabinets conforming to UL 50, "Cabinets and Boxes."

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050-1.04.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Square D

B. Cutler Hammer/Westinghouse

C. ITE Siemens

2.2 SWITCHES:

A. General: Provide individually enclosed air-break switches as indicated and scheduled on the drawings , with all current-carrying parts enclosed and manually operable by means of external handles. Switches shall be heavy duty (HD) type, ampere and horsepower rated.
   1. Provide cartridge enclosed fuses and rejection fuse holders when fused switches are indicated.
   2. Provide electrically tripped switches where indicated.
   3. Provide NEMA 1 enclosure for indoors, NEMA 3R enclosure for outdoors, or as indicated on the drawings .

B. Ratings: Conform to NEMA KS 1 for voltage and horsepower ratings.
   1. Voltages shall be 250 or 600 as determined by the circuit voltage.

C. Switching Action: Provide quick-make, quick-break type switch action.

D. Construction: All current carrying parts shall be high conductivity copper, with heating ratings conforming to UL 98.
   1. Provide silver tungsten or silver-plated copper contacts.
   2. Provide fuse holders of the rejection type, sized for fuses scheduled.

3. Provide interrupting ratings minimum 10 times locked rotor current of NEMA maximum motor horsepower rating.
4. Arrange for padlocking with two locks in either "off" or "on" position.

E. Fuses: Provide fuses of class, type and rating indicated on the drawings and schedules.

PART 3PART 3 - EXECUTION

3.1 INSTALLATION OF SWITCHES:

A. Installation: Install switches in conformance with the manufacturer's requirements and NFPA 70, Article 380 "switches." Provide grounding in accordance with NFPA 70, Article 250.

END OF SECTION 16440

DIVISION 16450

SECONDARY GROUNDING

PART 1 - GENERAL

1.1 SCOPE:

A. Provide secondary grounding work as indicated on drawings and by the requirements of this Section.

1.2 CONDITIONS OF THE CONTRACT:

A. All work shall be in accordance with the terms and conditions of the contract documents.

1.3 STANDARDS:

A. All work shall comply with national, federal and local electrical codes.

B. American National Standards Institute (ANSI):
   1. C2 - National Electric Safety Code

C. American Society for Testing and Materials (ASTM):
   1. B 1 - Standard Specification for Hard-Drawn Copper Wire
   2. B 2 - Standard Specification for Medium-Hard-Drawn Copper Wire
   3. B 3 - Standard Specification for Soft or Annealed Copper Wire
   4. B 8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
   5. B 228 - Standard Specification for Concentric-Lay-Stranded Copper-Clad Steel Conductors

D. Institute of Electrical and Electronics Engineers (IEEE):
   1. 141 - Recommended Practice for Electric Power Distribution for Industrial Plants
   2. 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems
   3. 241 - Recommended Practice for Electric Power Systems in Commercial Buildings

E. Underwriters Laboratories, Inc. (UL):
   1. 467 - Grounding and Bonding Equipment
   2. 869 - Service Equipment

F. UL Labels: Provide grounding electrodes and connectors which are UL listed and labeled.

1.4 MATERIALS AND COMPONENTS:

A. Materials: Provide an electrical system and equipment grounding system consisting of an assembly of materials including, but not limited to, cables, connectors, ground rods, bonding jumpers, surge arresters, and all accessories necessary to make a complete installation. All materials utilized in the grounding system shall meet the requirements of the standards listed and shall also meet established industry standards for the applications indicated.

B. Components: Provide raceways, boxes and fittings for grounding conductors. Install grounding conductors in one or more of the following types of raceway unless direct buried or exposed conductors are specified:
   1. Galvanized rigid steel conduit
   2. Electric metallic tubing (EMT)
   3. Flexible metal conduit (Commercial Greenfield)
   4. Liquid tight flexible metal conduit

PART 2 – PRODUCTS

2.1 CONDUCTORS: WIRE AND CABLE TYPE:

A. Equipment Grounding Conductors: Provide insulated equipment grounding conductors which run in the same raceway with circuit wires where indicated.

B. Bare Ground Conductors: Provide bare ground conductors for grounding of transformers, switchgear, other service equipment, grounding service poles and electrical equipment structures both underground and above ground. Conductors shall be stranded copper conductors.

C. Braided Bonding Jumpers: Provide braided copper tape constructed of No. 30 gauge bare copper wires sized to suit the application.

D. Flexible Jumper Straps: Provide flat, flexible, braided conductors consisting of minimum 480 strands of No. 30 gauge bare copper wire with 1/4-inch by 2-inch copper bus bar ends where indicated for a specific application.

2.2 GROUND BUS:

A. General: Provide minimum 1/4-inch by 2-inch hard drawn copper system ground bus where indicated on the drawings, or specified .

2.3 BONDING PLATES, CONNECTORS, TERMINALS AND CLAMPS:

A. General: Provide copper bonding plates, connectors, terminals, lugs, and clamps meeting the requirements of NFPA 70 and UL to provide a complete secondary grounding system shown on the drawings .

2.4 FIELD WELDING:

A. General: Where welded connections are indicated or required, such as buried connections to cables or ground rods, such welds shall be made by the exothermic process utilizing factory provided molds.

PART 3 - EXECUTION

3.1 INSPECTION:

A. General: Examine all areas and conditions under which electrical grounding connections are to be made. Do not proceed with the grounding work until such unsatisfactory conditions have been corrected.

3.2 GROUNDING SECONDARY BUILDING SERVICE:

A. General: Supplement the grounded neutral of the secondary distribution system with an equipment grounding system to properly safeguard equipment and personnel. The system shall, as a minimum, comply with NFPA 70. Where the drawings exceed the requirements of NFPA 70, the drawings take preference.

B. Ground Fault Currents: Provide the equipment grounding system such that all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment, and other conductive items in close proximity with electrical circuits operate continuously at ground potential and provide a low impedance path for possible ground fault currents.

C. Ground Bus: Provide where indicated, a minimum 2-inch by 1/4-inch bare copper ground bus spaced 1 inch from the wall and not more than 6 inches above the finished floor in each transformer room and switchgear room. The required length of the ground bus shall be as shown on the drawings. Connect the ground bus to at least three minimum 3/4-inch by 10 feet long driven ground rods by utilizing bare hard-drawn copper conductors or insulated conductors in conduit. Make connections between the ground bus and the ground rods by exothermic welds on both ends of the ground conductors.

D. Ground Rods: Locate the ground rods a minimum of one rod length from each other and at least the same distance from any other grounding electrodes. Interconnect the ground rods with bare copper conductors buried at least 24 inches below grade. Connect the bare cable ground loop to the ground rods by means of exothermic welds.

E. Testing: Test the installation for resistance to ground. Where the resistance exceeds the resistance to ground specified on the drawings provide additional ground rods at no additional cost.

F. Metallic Water Service Pipe: Provide a minimum No. 3/0 AWG green insulated copper ground conductor in conduit from the building main service equipment, or the ground bus, to the main metallic water service entrance. Connect this ground conductor to the main metallic water service pipe by means of an adequate ground clamp. Where a dielectric main water fitting is installed, connect this ground conductor to the street side of the fitting. Do not install a grounding jumper around this fitting. Bond the conduit to the ground conductor at each end. Provide a jumper with ground clamps around the water meter.

G. Common Ground Bus: Connect the system neutral ground and the equipment ground system to the common ground bus as indicated on the drawings. Where the connection is not shown, provide connection as required by NFPA 70.

H. Secondary Service Grounding: Ground secondary services at the supply side of the secondary disconnecting means and at the related transformers in accordance with the requirements of NFPA 70. Provide each service disconnect enclosure with a neutral disconnecting means and an insulated neutral stud which interconnects with the insulated neutral and uninsulated equipment ground buses to establish the system common ground point. Locate the neutral disconnecting link or links so that the low voltage switchgear neutral bar with all interior secondary neutrals can be isolated from the common ground bus and from the service entrance conductors.

3.3 GROUNDING SECONDARY DISTRIBUTION:

A. General: Size all required equipment grounding conductors and straps in compliance with NFPA 70. Provide green colored insulation on all equipment grounding conductors of the same type and class as that specified for the associated phase and neutral conductors of the secondary distribution system. Braze or connect the feeder and branch circuit grounding conductors to the ground bus with approved pressure connectors.

B. Grounding Conductor: Provide a continuous grounding conductor for each feeder serving several panelboards. Connect this ground conductor to each related cabinet ground bar.

C. Insulated Equipment Grounding Conductor: Provide a separate green insulated equipment grounding conductor for each single or three phase feeder and each branch circuit with a three phase protective device. Install the required grounding conductor in the common conduit with the related phase and neutral conductors. Where parallel feeders are installed in more than one raceway, provide a green insulated equipment grounding conductor in each raceway.

D. Single Phase Branch Circuits For Lighting: Provide single phase branch circuits required for 120 and 277 volt lighting consisting of phase, neutral and green insulated ground conductor installed in a common metallic conduit.

E. Single Phase Branch Circuits For Receptacles, Motors and Other Similar Equipment: Provide single phase branch circuits serving receptacles, motors, and other similar equipment consisting of phase, neutral, and green insulated equipment ground conductor installed in a common conduit.

F. Flexible Metallic Conduit: Provide flexible metallic conduit equipment connections utilized in conjunction with single phase branch circuits with green insulated grounding conductors connected to suitable grounding terminals at each end of the flexible conduit.

G. Single Phase Branch Circuits For Special Equipment: Provide single phase branch circuits serving special equipment, such as X-ray equipment, and all branch circuits installed in nonmetallic or flexible conduits with a separate grounding conductor.

H. Pressure Connectors: Provide the number and size of pressure connectors required for all equipment grounding bars in panelboards and other electrical equipment for the termination of equipment grounding conductors. Provide pressure connectors for all active and all spare circuits.

3.4 BRANCH CIRCUIT GROUNDING REQUIREMENTS:

A. General: Provide, in the same raceway with the associated phase and neutral conductors, a green colored equipment ground conductor having the same type and class insulation as the associated branch circuit conductors. Provide each ground conductor with spade type terminals or solderless pressure connectors to suit the requirements of the circuit.

B. Branch Circuit Ground Conductors: Connect ground conductors for branch circuits as follows:
   1. Connect the ground conductor, accompanying the circuit serving the receptacle, to a green No. 10-32 "washer-in-head" machine screw threaded to the receptacle outlet box. Extend a green insulated ground wire from the ground terminal on the receptacle to this ground screw. Receptacles with special cast boxes having factory designed and approved ground paths shall not require a separate ground jumper.
   2. Provide an insulated ground wire from the green No. 10-32 machine screw in each ceiling outlet box or above ceiling junction box through the stem or flexible conduit to the ground terminal on each luminaire.
   3. Provide an insulated ground wire from the ground terminal in the associated junction box or disconnect enclosure to a motor through the flexible conduit connection.
   4. From the associated motor starter to each motor provide an insulated ground conductor in the same conduit as the associated phase conductors. Connect to the starter enclosure and the motor connection box. Originate the ground conductor at the ground bus of the panelboard serving the motor and bond to all intermediate devices.
   5. Provide a green insulated ground conductor from the equipment ground bus in each motor control center through conduit and flexible metallic conduit to the ground terminal in the connection box mounted on each motor.
   6. Provide a green insulated ground wire from the ground bus in the switchgear, switchboard, or distribution panel to the equipment ground bar on a busway. Make all connections between the ground buses in an approved manner.
   7. Provide a separate green insulated ground wire from a computer area power panel ground bus through each branch circuit connected to this power panel. Size these ground conductors as required by NFPA 70, but provide conductors and connections of sufficient size to ensure that no ground circuit shall exceed 3 ohms resistance between the final connection point and the building grounding system. Where the 3 ohm limit is exceeded, provide larger conductors at no additional cost.
   8. Provide a separate green insulated ground conductor in all circuits supplying X-ray equipment.

9. Provide a green insulated equipment ground conductor in all nonmetallic conduits or ducts unless such nonmetallic conduits or ducts are used for telephone or data cables. No grounding conductors are required in telephone or electronic data raceways.
10. Provide a green insulated grounding conductor to all electric devices such as electric air cleaners or heaters. Where these devices are installed in air ducts, bond the conductor to each such unit, the air duct, and to the ground bus in the associated panelboard.
11. Provide a separate green insulated ground conductor to each electric immersion type water heater or surface anti-frost heating cables. Bond this conductor to the water piping at the unit and to the ground bus in the associated panel board.

3.5 TERMINATIONS AT EQUIPMENT WITHOUT PROVISION FOR GROUND CONDUCTOR TERMINATION:

A. General: Where metallic conduits terminate at a metallic housing without mechanical connection, such as locknuts and bushings, provide each conduit with a ground bushing. Connect each such ground bushing with a bare copper conductor to the ground bus in the electrical equipment. Size the conductor as required by NFPA 70. Bond electrically non-continuous conduits at both entrance and exit with a ground bushing and bare jumper as described.

3.6 TESTING:

A. General: Subject the completed equipment grounding system to a megger test at each service disconnect enclosure ground bar to ensure that the ground resistance without chemical treatment or other artificial means does not exceed the level specified.

B. Ground Test: Provide certified test reports of the ground resistance at each service enclosure ground bus. Modify the grounding system as required to meet the specified resistance levels.

END OF SECTION 16450

DIVISION 16500

LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SCOPE:

A. Provide lighting fixtures and lamps as shown and specified. Work of this Section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

A. Work shall comply with national, federal and local electrical codes.

B. Manufacturers: Provide products of firms regularly engaged in the manufacture of interior lighting fixtures of types and ratings required, whose products have been in satisfactory use in similar service for not less than ten (10) years.

C. Certified Ballast Manufacturers Association (CBM) Labels: Provide fluorescent-lamp ballasts which comply with CBM standards and carry the CBM label.

D. National Electrical Manufacturers Association (NEMA): Comply with applicable requirements of NEMA LE 4, "Recessed Luminaires, Ceiling Compatibility" pertaining to recessed luminaires.

E. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code," as applicable to construction and installation of interior building lighting fixtures and emergency lighting.

F. Provide emergency and exit marker lighting units that comply with NFPA 101, "Code for Safety to Life From Fire in Buildings and Structures," federal and local codes.

G. Underwriters Laboratories, Inc. (UL): Comply with UL standards pertaining to interior lighting fixtures.

1. 57 - Electric Lighting Fixtures
2. 542 - Lamp Holders, Starters and Starter Holders for Fluorescent Lamps
3. 676 - Underwater Lighting Fixtures
4. 844 - Electric Lighting Fixtures for Use in Hazardous (Classified) Locations
5. 924 - Emergency Lighting and Power Equipment
6. 1029 - High-Intensity-Discharge Lamp Ballasts
7. 1570 - Fluorescent Lighting Fixtures
8. 1571 - Incandescent Lighting Fixtures
9. 8750 - LED Lighting
10. 1572 - High Intensity Discharge Lighting Fixtures
11. 1573 - Stage and Studio Lighting Units
12. 1574 - Track Lighting Systems

H. UL: Provide interior lighting fixtures and emergency lighting units which have been UL listed and labeled.

I. National Appliance Energy Conservation Act of 1987. Amendments of 1988 (Public Law 100-357 dated June 28, 1988): Requirements for Energy-Efficient Ballasts.

J. Comply with the provisions of the Energy Policy Act of 2005 (EPACT '05) pertaining to electric lamps.

1.4 SUBMITTALS:

A. Submit shop drawings in accordance with Section 16050-1.04.

B. Identify all fixtures by their type, as noted on the contract documents and their use in conjunction with special control schematics, (i.e.: dimmers, photocell, time clock, etc.).

C. Delivery lead time shall not be a valid reason to request luminaire substitution unless lead time from the specified manufacturer is in excess of 13 weeks. It shall be the sole responsibility of the Contractor to determine necessary equipment lead times, deliver submittals for review in a timely fashion, and place orders accordingly to ensure timely delivery.

D. If requesting a substitution, (which must be requested a minimum of 7 days prior to bid), Contractor shall provide unit and extended pricing for specified luminaire, unit and extended pricing for proposed alternate, and unit and extended savings to owner to be realized by accepting proposed alternate. Provide unit pricing for each luminaire type specified to provide a baseline comparison for substitution request.

E. Substitution supplier shall complete photometric studies for Engineer evaluation to prove fixture performance meets or exceeds specified fixture. Final decision by the Engineer.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Lighting Fixture Requirements: Provide fixtures which meet the requirements of these specifications and the project drawings.

B. Provide proper and sufficient support for all lighting fixtures as required. Properly secure all lighting fixtures and ceiling mounted devices to building structural system. Furnish and install all auxiliary support hanger rods and cross angles required for Code compliance and job conditions.

C. Due to the various switching requirements, electrical requirements, emergency requirements and architectural requirements on the project, the fixtures specified for use on the project shall be carefully and fully coordinated with the complete set of specifications and the manufacturer prior to ordering. The contractor shall review each fixture location and provide fixtures with the proper voltage, ballasts, lengths, feeds, circuiting, mounting, emergency feeds, emergency ballasts, proper suspensions, emergency accessories, overall lengths, accessories, etc., for a complete and proper fixture installation. Any failure to fully coordinate fixture requirements prior to ordering shall result in the contractor bearing any costs to remove the fixtures and provide new fixtures to fully meet the requirements of the specifications and to resolve any conflicts.

D. General Requirements: Provide lighting fixtures of sizes, types, and ratings indicated; complete with, but not necessarily limited to, housings, lamps, lamp holders, reflectors, ballasts, starters, wiring and batteries and battery charging devices. Verify fixture finish and colors with architect.
   1. Form fixture sheet metal housings to prevent warping and sagging. Return or clean all edges free of all burrs or sharp spots. Provide fixtures free from light leaks after installation.
   2. Hinged door closure frames shall operate smoothly without binding. Fabricate frames to allow lamp installation/removal without tools. Hinge mechanism shall be designed to preclude accidental falling of hinged door closure frames during relamping operations and while secured in operating position.
   3. Interior light reflecting surfaces shall have reflectance of not less than 85 percent for white surfaces, 83 percent for specular surfaces, and 75 percent for specular diffusing surfaces.
   4. Provide manufacturer's standard finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, or similar defects. Remove any fixtures showing evidence of rust at time of final inspection.

5. Light transmitting components shall be fabricated of 100 percent virgin acrylic plastic or water white, annealed, crystal glass. Minimum average thickness of lenses for fluorescent fixtures shall be 0.125". Fabricate frames to allow for expansion of lens without distortion or cracking. For plastic lenses, diffusers, and covers, provide high resistance to yellowing due to UV radiation.
6. Provide each fixture with lamps as indicated. Where lamps are not indicated, provide lamps as recommended by manufacturer.
7. For locations with severe environmental conditions such as damp, high temperature, low temperature or flammable vapors provide fixtures specifically labeled and listed for the particular conditions to be encountered.

E. Coordinate suspension length of fixtures with pendants or stems in field prior to ordering fixtures.

2.2 RECESSED AND FLUSH-MOUNTED FIXTURES:

A. General: Provide type that can be relamped from the bottom, except as otherwise indicated. Trim for the exposed surface of flush-mounted fixtures shall be as indicated. Provide trims, mountings, supports and adapters for type of ceiling in which mounted. Verify before ordering.

2.3 SUSPENDED FIXTURES:

A. General: Provide hangers capable of supporting twice the combined weight of the adjoining fixtures and provide with swivel hangers to ensure a plumb installation. Hangers shall be cadmium-plated steel with swivel-ball tapped for the conduit size indicated. Where indicated, provide shock-absorbing type hangers which allow fixtures to swing within an angle of 20 degrees.

B. Support: Brace pendants 4 feet or longer to limit swinging. Provide single-unit suspended fluorescent fixtures with twin-stem hangers.

C. Multiple-Unit or Continuous Row Fixtures: Provide multiple-unit or continuous row fluorescent fixtures with tubing or stem for wiring at one point and a tubing or rod suspension for each unit length of chassis, including one at each end. Provide rods with minimum 3/16" diameter.

D. Direct/Indirect Fixtures: Provide clear, flat top lens on fixtures with open lamps as the upper (indirect) component.

2.4 EXIT SIGNS:

A. General: Provide exit signs conforming to UL 924, NFPA 70 and NFPA 101.

B. Power: Provide exit signs as follows:
1. AC powered exit signs.
2. Self-Powered Exit Signs (Battery Type): Provide with automatic high/low trickle charger in a self-contained power pack with self diagnostics. Battery shall be sealed, maintenance-free, nickel cadmium type with a 15-year life expectancy and a 5-year full warranty plus 7-year pro-rata.
3. Self-Powered Exit Signs (Luminous Source Type): Provide signs with solid-state tritium gas energy source which allows legibility in total darkness at 100 feet after 10 years. In addition to the requirements of UL and NFPA, signs shall be licensed for public use by the U.S. Nuclear Regulatory Commission.

C. Luminaire Requirements:
1. Letters shall be 6" tall with 3/4" strokes formed by a stencil face.
2. Provide red/green fiberglass panel behind stencil face.
3. Provide L.E.D., regular AC supply.
4. Provide illuminated arrows as indicated.
5. Provide single or double face as indicated.
6. Provide ceiling, end wall, back wall or pendant mounting as indicated.

7. Units mounted exposed to weather or damp/wet environment shall have a damp or wet UL label as appropriate and shall not be constructed of steel.
8. Provide internal provisions for grounding.
9. Provide wireguard on fixtures subject to damage from athletic equipment (gymnasium, etc.) or at locations where these fixtures are subject to damage from moving equipment.

2.5 EMERGENCY LIGHTING EQUIPMENT:

A. General: Provide emergency lighting equipment conforming to UL 924, NFPA 70 and NFPA 101.
   1. Remote emergency lighting unit for use with self-contained emergency lighting units as remote power sources.
      a. Lamps and finishes shall be compatible with primary unit with which used.
   2. Emergency fluorescent power pack, internal type, factory installed within body of fixture as indicated in schedule and including the following features:
      a. Packaged battery/charger/inverter unit.
      b. Provide with test switch and LED indicator light visible and accessible without entering ceiling space.
      c. Sealed, maintenance-free, nickel-cadmium batteries with 5-year full warranty plus 5-year pro-rata, minimum.
      d. Fully automatic solid state charger.
      e. Operation: Relay turns two lamps of associated fixture on automatically when supply circuit voltage drops to 80 percent of normal or below. Lamps operate for duration of outage, for a minimum of 5yr, 1.5 hours. When normal voltage is restored, battery is automatically recharged.
      f. Lamp output when supplied by power pack shall be 1400 lumens, minimum, for 90 minutes.
      g. The emergency ballast, via interconnected circuitry, shall delay AC ballast operation for approximately 3 seconds to prevent false tripping of AC ballast end-of-lamp-life shut down circuits.
      h. Where emergency ballasts are to be provided with pendant fixtures, the installation of the specified ballast shall be fully coordinated and verified with the lighting manufacturer so that the proper circuiting and feeds may be provided to accommodate the specified emergency ballast.
      i. Emergency ballasts shall be provided with a constant hot, unswitched feed from lighting circuit to allow fixture to be switched on and off along with other lighting in room without activating emergency ballast. Upon loss of power, emergency ballast shall immediately power fixture on regardless of switch position.
   3. Emergency fluorescent power pack, external type, for field installation external to fixture served. Features as indicated in schedule and as follows:
      a. Self-contained battery/charger/invertor unit arranged for mounting exposed, on or beside fixture, or flush in exposed grid lay-in type ceiling.
      b. Provide with test switch and LED indicator light, visible and accessible without entering ceiling space.
      c. Sealed, maintenance-free, nickel-cadmium batteries with normal 10-year life, minimum.
      d. Fully automatic solid state constant current charger.
      e. Operation: Relay turns two lamps on automatically when supply circuit voltage drops to 80 percent of nominal or below. Lamps operate for duration of outage, for a minimum of 5yr, 1.5 hours. When normal voltage is restored, battery is automatically recharged.
      f. Lamp output when supplied by power pack shall be 1400 lumens, minimum, for 90 minutes.

g. The emergency ballast, via interconnected circuitry, shall delay AC ballast operation for approximately 3 seconds to prevent false tripping of AC ballast end-of-lamp-life shut down circuits.
h. Where emergency ballasts are to be provided with pendant fixtures, the installation of the specified ballast shall be fully coordinated and verified with the lighting manufacturer so that the proper circuiting and feeds may be provided to accommodate the specified emergency ballast.
i. Emergency ballasts shall be provided with a constant hot, unswitched feed from lighting circuit to allow fixture to be switched on and off along with the other lighting in the room without activating emergency ballast. Upon loss of power, emergency ballast shall immediately power fixture on regardless of switch position.

4. Where indicated or where equipment is subject to damage, provide heavy chrome plated wire guard arranged to protect lamp heads or exit lights. Emergency lighting control units shall be provided when lighting is to be powered by emergency circuitry and controlled along with adjacent lighting on normal power circuits. The device shall be installed with a connection to the normal power unswitched feed from normal power lighting in room as well as the switched feed from the normal power lighting in room. Upon loss of power, fixtures on emergency power shall immediately turn on, regardless of switch position until normal power is restored. Emergency lighting control unit shall be a 20 amp Bodine #BLCD-20B. The unit shall be installed in full accordance with manufacturer's instructions to accomplish the switching and emergency lighting operation specified in the contract documents.
5. Provide time delay relay in emergency lighting unit control circuit arranged to hold unit "on" for fixed interval after restoration of power subsequent to an outage. Provide adequate time relay to permit HID lamps to restrike and develop adequate output. Emergency lighting relay control devices shall be provided when emergency lighting is switched from the normal power system to the emergency power system upon loss of utility power. The device shall be installed with an unswitched, constant hot normal power feed, a switched normal power feed and an unswitched, constant hot normal power feed. Additionally, this device shall be provided to provide a bypass for dimmer panels and dimming controls under power loss conditions. This device shall be installed so that the fixture is powered and controlled along with the normal power lighting in the space. Upon loss of power, the fixture shall immediately be transferred to a constant hot, emergency feed to provide full brightness operation of the fixture until normal power is restored, regardless of the switch or dimming control state. The emergency lighting control relay device shall be a 20 amp Bodine #GTD20A. The unit shall be installed in full accordance with manufacturer's instructions to accomplish the switching/dimming and emergency lighting operation specified in the contract documents.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Setting and Securing: Set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved shop drawings. Conform to the requirements of NFPA 70.

B. Mounting: Mounting heights specified or indicated are to bottom of fixture for suspended and ceiling-mounted fixtures and to center of fixture for wall-mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before installation is commenced and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.

C. Support: Recessed and semi-recessed fixtures may be supported from suspended ceiling support system ceiling tees if the ceiling system support rods or wires are provided with a minimum of four rods or wires per fixture and located not more than 6" from each corner of each fixture.

1. For round fixtures or fixtures smaller in size than the ceiling grid, provide a minimum of four rods or wires per fixture and locate at each corner of the ceiling grid in which the fixture is located.
2. Do not support fixtures by ceiling acoustical panels.
3. Where fixtures of sizes less than the ceiling grid are indicated to be centered in the acoustical panel, support such fixtures independently or with at least two 3/4" metal channels spanning and wired to the ceiling tees.
4. Provide rods or wires for lighting fixture support under this Section of the specifications.
5. Additionally, for recessed fixtures, provide support clips securely fastened to ceiling grid members, a minimum of one at or near each corner of each fixture.

D. Coordination: Coordinate with other trades as appropriate to properly interface installation of lighting fixtures with other work.

E. Grounding: Ground non-current-carrying parts of electrical equipment. Where the copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.2 EXIT AND EMERGENCY LIGHTS:

A. General: Wire exit and emergency lights on separate circuits using separate conduits other than those used for normal power unless otherwise noted.

3.3 ADJUST AND CLEAN:

A. Clean: Clean lighting fixtures of dirt and debris upon completion of installation.

B. Protection: Protect installed fixtures from damage during remainder of construction period.

3.4 FIELD QUALITY CONTROL:

A. Tests: Upon completion of installation of lighting fixtures, and after building circuits have been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting. Provide documentation of these tests in the operation and maintenance manuals.
   1. For normal and emergency building lighting, upon completion of the installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this Section.
   2. Test all wiring with an insulation testing instrument, both before and after connection of fixtures and equipment. The minimum resistance shall be 250,000 ohms.
   3. Conduct ground resistance tests on each fixture. The maximum resistance to ground of grounded equipment shall not exceed 25 ohms.
   4. To demonstrate all functions and protective operations of the exit and emergency lighting system, simulate malfunctions to verify proper functioning. Provide instruments as required to make positive observation of test results. Include the following in tests:
      a. Duration of supply.
      b. Low battery voltage shut down.
      c. Normal transfer to battery source and retransfer to normal.
      d. Low supply voltage transfer.

B. Replacement Lamps: At the time of substantial completion and prior to field tests, replace lamps in interior lighting fixtures which are observed to be noticeably dimmed after contractor's use and testing. Furnish stock or replacement lamps amounting to 10 percent (but not less than one lamp in each case) of each type and size lamp used in each type fixture. Deliver replacement stock as directed.

DIVISION 16500
LIGHTING FIXTURES

END OF SECTION 16500

DIVISION 16700

CONDUIT FOR COMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 SCOPE:

A. The General Provisions of the Contract, including Conditions of the Contract and Division 1 of the Specifications, apply to the work in this section.

B. This section is hereby made a part of all other sections of Division 16 as fully as if repeated in each therein.

1.2 SCOPE OF WORK:

A. The contractor shall furnish all equipment and labor necessary for and reasonably incidental to the complete installation of the conduit for communications systems as outlined in the following specifications including, but not limited to, telephone, data and security system rough-in.

B. Installation of the systems shall be as outlined in the following specifications, including but not limited to:

1. Verification of dimensions and conditions at project site
2. Installation in accordance with contract documents and applicable code requirements
3. Instruction of operating personnel
4. Maintenance services for one (1) year following acceptance of systems.

1.3 STANDARDS:

A. All of the above equipment shall be installed in the conduit systems in walls, floors, and inaccessible ceilings and hereinafter specified or in surface-mounted raceway.

1.4 FIELD QUALITY CONTROL:

A. Contractor shall show satisfactory evidence of maintaining a service organization capable of furnishing adequate inspection and service to equipment and be prepared to offer service contract for maintenance of system after guarantee period.

PART 2 - PRODUCTS:

2.1 TELEPHONE, DATA AND CATV/MATV SYSTEM:

A. Telephones and data and related equipment shall be provided by others.

B. Provide conduit from the telephone service as shown on drawings. Terminate conduit with an insulating bushing at equipment location.

C. Provide minimum 3/4" conduit from each telephone or data to an accessible ceiling location and terminate in insulating bushing. Outlet boxes and conduit shall be the same as specified for power and lighting. Cover plates shall be provided for all unused outlets per the symbol list.

D. Coordinate telephone conduit work with local telephone utility company before installing same.

PART 3 - EXECUTION:

3.1 GENERAL:

A. Furnish equipment, accessories and material required for installation of the systems in accordance with these specifications.

B. Components and system shall meet or exceed minimal standards issued by EIA. Work in conjunction with this installation shall meet provisions of National Electric Code and applicable local codes.

3.2 INSTALLATION:

A. Provide conduit and wire as shown and as specified in other sections.

B. Provide all equipment as indicated on drawings and/or specifications. Verify location and orientation with Owner's Representative prior to rough-in.

3.3 ADJUSTMENT AND CLEANING:

A. Clean system equipment and cabinets of dirt and debris.

END OF SECTION 16700