Project Manual
Project Number: 20-006

Duneland School Corporation
2020 Nurse's Office Renovations at:
Bailly Elementary School
800 South 5th Street, Chesteron, Indiana 46304

For

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

Issued for Proposal: April 7, 2020

TRIA ARCHITECTURE
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South Suburban Office: 1820 Ridge Road, Suite 209, Homewood, Illinois 60430
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SECTION 00100

INSTRUCTIONS TO PROPOSERS

PART 1 – GENERAL

1.1 **PROPOSAL**

A. The Board of School Trustees of the Duneland School Corporation will receive sealed proposals for the 2020 Nurse's Office Renovations at: Bailly Elementary School.

B. To receive full consideration proposals must contain the following documents properly completed and signed:
   1. Proposal Form.
   2. Addendum to Contract for Construction.
   3. Certification Regarding Investment Activities in Iran.
   4. Fully completed AIA document A305 providing the Contractor's qualifications and references.

1.2 PREPARATION FOR PROPOSALS

A. Proposals to be entitled for consideration must be made in accordance with the following instructions.
   1. Submit one copy of proposal on forms provided by the Architect with all blank spaces for proposal prices filled in, in ink, or typewritten.
   2. Submit one reproduction of proposal forms and associated documents.
   3. Submit proposal 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: 2020 Nurse's Office Renovations at: Bailly Elementary School - PROPOSAL.
   4. Sealed Proposals will be received until 10:30 a.m. CST (local time), on April 22, 2020 for all specified work at Duneland School Corporation Administration Office, 601 West Morgan Avenue, Chesterton Indiana 46304.
   5. Proposals received after this time shall be returned unopened.
   6. Erasures or written memorandum on the Proposal Form are prohibited. Include additional explanations, statements, or qualifications in a separate sheet attached to the Proposal Form.
   7. The Base Proposal shall appear only where called for in the Proposal Form and shall not appear elsewhere in the proposal. Any Alternate prices (other than those set forth in the Proposal Form) shall be listed on the Substitution Sheet.
   8. Fill in all blank spaces for the proposal items with prices, or if not applicable, the words "No Proposal."

B. The Owner reserves the right to reject any or all proposals 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 proposals at any time in the proposal process.

E. All costs associated with developing or submitting a proposal 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 proposals does not commit the Owner or Architect, or any of their agents, to pay any costs incurred in the preparation or submission of a proposal.

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

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

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 Proposers.

B. Proposal Documents include the Instructions to Proposers, the 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 proposals.
C. Addenda are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the proposal 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, direct mail or United Parcel delivery. Proposers are to consider all addenda, regardless of method of transmittal, as a binding modification to the contract documents.
   2. It is the proposer's responsibility to ascertain from the Architect that they have received all addenda issued to the proposal documents prior to submitting their proposal.

1.4 DOCUMENTS

A. The Proposal 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 Proposal 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 proposal 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 proposal is submitted and if drawings are returned in good condition by May 11, 2020, as well as to the winning proposer.
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 proposal purposes (including Compact Disc), obtained by deposit or purchase MUST BE RETURNED to the Printer, transportation prepaid, within ten days after opening of the Proposals or deposit checks will not be returned.

1.5 EXAMINATION OF DOCUMENTS AND SITE

A. Proposers 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 non-mandatory Pre-Proposal Conference will be held on April 15, 2020, 10:30 a.m. at Bailly Elementary School, 800 S 5th St, Chesterton, IN 46304. All Proposers 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 immediately following the pre-proposal meeting at the school. The Architect will transmit to prospective proposers of record any Addenda the Architect considers necessary in response to questions arising at the conference.

1.6 POST-PROPOSAL QUALIFICATION

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

1.7 PROPOSAL WITHDRAWAL

A. Any proposer may withdraw their proposal prior to the scheduled closing time for receiving proposals. All proposers shall hold their Proposals open for a period of sixty calendar days from the date of Proposal Opening. The Owner and Proposers may agree to extend the period of irrevocability beyond the sixty-day period.

1.8 INTERPRETATION OF PROPOSAL DOCUMENTS

A. Submit all questions regarding the Proposal Documents to the Architect. Replies will be issued to all proposers of record in the form of an Addendum. Questions received less than five days before the proposal 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 proposers 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 proposal 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 bona fide Proposer with full consideration given to Contractor's Completion Schedule.

B. In determining the lowest responsible bona fide Proposer and in awarding a contract, the Owner may take into consideration skill, facilities, capacity, experience, ability, responsibility, previous work, financial standing of proposer, amount of work being carried on by proposer, 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. Proposals shall be expressly based on the following items:
   1. Instructions to Proposers.
   2. Proposal Form.
   3. General Conditions.
   4. Plans and Specifications.
   5. Addenda

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

1.12 OTHER CERTIFICATIONS AND SUBMITTALS

A. All proposers must complete and sign the following certifications and submit them with their proposals. FAILURE TO DO SO MAY RESULT IN DISQUALIFICATION OF PROPOSER.
   1. Addendum to Contract for Construction.
   2. Certification Regarding Investment Activities in Iran.
   3. Fully completed AIA document A305 providing the Contractor's qualifications and references.

1.13 POWER OF ATTORNEY

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

1.14 EMPLOYMENT AND LABOR PROVISIONS

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

PROPOSAL FORM

THE PROJECT AND THE PARTIES

1.1 NAME OF PROPOSER: _____

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 proposal documents for the construction of the 2020 Nurse's Office Renovation at: Bailly 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 Proposal for all Work:

   _____

   _____

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

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

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

C. Time of Completion: If awarded the Contract, the proposer agrees to complete all Construction Work and achieve Substantial Completion by August 3, 2020, 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.

D. 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 proposer does not change the specified Substantial Completion Date unless the Owner chooses to accept the proposer's date when awarding the contract.
   1. Specified Substantial Completion Date: August 3, 2020, 5:00 p.m.
   2. Contractor's Desired Substantial Completion Date: _____.

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

SECTION 00300

PROPOSAL FORM

BREAKDOWN:

Division 01:	General Requirements – Allowances:	$
Division 01:	General Requirements – O&P:	$
Division 01:	General Requirements – Remaining Items:	$
Division 02:	Sitework:	$
	Subcontractor (Legal Name, Address):	
Division 03:	Concrete:	$
	Subcontractor (Legal Name, Address:	
Division 04:	Masonry:	$
	Subcontractor (Legal Name, Address):	
Division 05:	Metals:	$
	Subcontractor (Legal Name, Address):	
Division 06:	Wood and Plastic:	$
	Subcontractor (Legal Name, Address):	
Division 07:	Thermal and Moisture Protection:	$
	Subcontractor (Legal Name, Address):	
Division 08:	Doors and Windows:	$
	Subcontractor (Legal Name, Address):	
Division 09:	Finishes:	$
	Subcontractor (Legal Name, Address):	
Division 10:	Specialties:	$
	Subcontractor (Legal Name, Address):	

SECTION 00300

PROPOSAL FORM

Division 15:	Mechanical - HVAC:	$ _____
	Subcontractor (Legal Name, Address):	_____
		_____
Division 15:	Mechanical - Plumbing:	$ _____
	Subcontractor (Legal Name, Address):	_____
		_____
Division 16:	Electrical:	$ _____
	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 proposal): $ _____

SECTION 00300

PROPOSAL FORM

FIRM NAME: _____

OFFICIAL ADDRESS: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

By: _____ Date: _____
(Signature)

_____
(Printed/Typed Name and Title)

Where the Proposer is a corporation, add Attest

_____ (SEAL)
Secretary (signature) Date

END OF PROPOSAL FORM

SECTION 00440

SUBSTITUTION SHEET

1.1 SUBSTITUTION INFORMATION

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

B. Proposers 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 proposals.

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

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

E. NOTE: Manufacturer's names and material approved by the Architect during the proposal 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 PROPOSER: _____

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 _____, 20____.

CONTRACTOR:

By: _____

Its: _____

SECTION 00700

GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

1.1 AIA Document A201, General Conditions of the Contract for Construction, 2017 Edition, attached, is the General Conditions between the Owner and Contractor.

1.2 AIA Document A101-Exhibit A, Insurance and Bonds, 2017 Edition, attached, is the Insurance and Bonds requirements, for the Owner and Contractor, for the project.

1.3 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™ – 2017

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 Avenue
Chesterton, Indiana 46304 »

THE ARCHITECT:
(Name, legal status and address)

« «Tria Architecture, Inc.»« »
«901 McClintock Drive, Suite 100
Burr Ridge, Illinois 60527»

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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.

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents ~~are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement,~~ 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, 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) a written amendment ~~to~~ of the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, ~~or (4)~~ (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 or proposal requirements.~~

~~**§ 1.1.2 The Contract**~~

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

~~**§ 1.1.3 The Work**~~

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

~~**§ 1.1.4 The Project**~~

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

~~**§ 1.1.5 The Drawings**~~

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

~~**§ 1.1.6 The Specifications**~~

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

~~**§ 1.1.7 Instruments of Service**~~

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

~~**§ 1.1.8 Initial Decision Maker**~~

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

§ 1.1.2 THE OWNER

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

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§ 1.1.5 The Project

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

§ 1.1.6 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams. Figured dimensions shall be followed in preference to measurements by scale. All dimensions shall be checked against field measurements of existing conditions to be taken by the Contractor.

§ 1.1.7 The Specifications

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

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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. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.10 The term "Contractor" as used herein shall refer to the Contractor or Construction Manager at Risk.

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."

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

§ 1.2.1.1 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.

§ 1.2.1.3 Large-scale drawings take precedence over small-scale drawings, figured dimensions over scaled dimensions and noted materials over graphic representations.

§ 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.

§ 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.

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§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

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

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 ~~Evidence of the Owner's Financial Arrangements~~Information and Services Required of Owner

§ 2.2.1 ~~Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations~~

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~~under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~ All other permits and fees shall be obtained and paid for by the Contractor under the Contract Documents. The Contractor shall be responsible to obtain all temporary permits including, but not limited to, demolition and canopy permits required to execute the Work

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

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

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

~~**§ 2.3 Information and Services Required of the Owner**~~
§ 2.2.2.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.2.2.3 If the employment of the Architect terminates, the Owner shall employ a successor whose status under the Contract Documents shall be that of the Architect.

§ 2.3.1 ~~Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.~~ **Surveys.** The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.2 The Owner shall ~~retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.~~ furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

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

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~~§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.~~

~~§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.~~

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

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or ~~repeatedly~~ fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. This right shall be in addition to and not in restriction or derogation of Owner's rights under Article 14 hereof.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ~~ten-day~~ seven-day (7) period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner ~~may,~~ may immediately, without prejudice to other remedies the Owner may have, correct such default or neglect. ~~Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable~~ In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor, the cost of correcting such deficiencies, including ~~Owner's expenses and~~ but not limited to, attorney's fees, compensation for the Architect's additional services ~~made necessary by such default, neglect, or failure. If current and future payments~~ and expenses incurred in connection with such default, neglect or failure. Said Change Order shall be deemed signed by the Contract for the purposes stated in Section 7.2.1 even if the Contractor fails to physically sign such Change Order. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, ~~the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.~~ 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. This right shall be in addition to and not in restriction or derogation of the Owner's rights under Article 14 hereof.

§ 2.6 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.

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, ~~become generally familiar with~~ has inspected the local conditions under which the Work is to be performed, and 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 the Contractor believes may not be satisfactory for the use shown, the Contractor shall so notify the Architect at least five (5) days before bids are due. Signing of the Agreement and starting the Work by the Contractor shall indicate the Contractor agreement with all details, construction procedures, and materials so shown and/or specified and shall indicate the Contractor's willingness to construct the Project in strict accordance with the Contract Documents and to guarantee the Project in full compliance with the warranty provisions of the Contract Documents. By executing this Agreement, the Contractor further acknowledges that it has satisfied itself as to the nature and location of the Work, the general and local conditions under which the Work is to be performed, 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 . Any failure by the Contractor to become acquainted with all the available information concerning these conditions will not relieve the Contractor from any obligations with respect to the Contract Documents.

§ 3.2.1.3 If Work is required in a manner that makes it impossible to produce the quality required by the Contract Documents, or should discrepancies appear among the Contract Documents, the Contractor shall request in writing an interpretation from the Architect before proceeding with the Work. 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 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. ~~These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering~~ 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 which should have been discovered by the Contractor.

§ 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.~~

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§ 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,~~ 3.2.2, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs ~~those obligations,~~ the obligations in Sections 3.2.2, 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures. 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 replacement of the Work and economic losses which proximately result from the breach of this duty. The Contractor shall be responsible to the Owner for the acts and omissions of the Contractor's employees, 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.~~
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.

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§ 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 the 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 labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the 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 Agreement 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

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and ~~new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.~~ 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.

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§ 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).

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

~~**§ 3.6 Taxes**~~

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 ~~Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies.~~ 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 or believes 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 for clarification by the Architect. 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 ~~costs~~ cost, damages, losses 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 14 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 that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15. 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

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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 by the Contractor 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 notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.~~

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

§ 3.9.4 The Contractor's superintendent must be dedicated solely to the 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 Documents by the Owner with seven days written notice.

§ 3.10 Contractor's Construction and Submittal Schedules

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

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shall be revised by the Contractor at appropriate intervals as required by the conditions of the Work ~~and Project.~~and Project, and shall provide for expeditious execution of the Work.

§ 3.10.2 The ~~Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.~~Contractor shall prepare 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 failure to object 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 failure to object 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 if progress is behind schedule, the Contractor's plan to recover the Work to meet the approved Construction 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 meeting 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 Project, 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 ~~make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives,~~ 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 ~~the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and~~ one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These, along with all operating manuals for all equipment, shall be available to the Architect 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 set of record drawings for the Owner and Architect of the as built plans and specifications for concealed work, particularly concealed piping and conduit. Any deviations from conditions shown on the Contract Drawings shall be shown and dimensioned on these record drawings. The Contractor shall develop layout drawings for concealed work that is schematically indicated on Contract Drawings in

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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 in the record drawings 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.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

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

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

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

~~**§ 3.12.10.1** If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.~~

§ 3.12.10.1. 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 of 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 on the accuracy and completeness of such certifications.

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

§ 3.13 Use of Site

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

§ 3.13.1 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.

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§ 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with prior written consent of the Owner and of the Separate ~~Contractor. Consent~~ Contractor such consent shall not be unreasonably withheld. The ~~Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.~~ 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 and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project. 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 the 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 with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor ~~shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses,~~ waives any right of contribution against and shall defend, indemnify and hold harmless Owner, any Owner's Representative, the Architect and each of their officers, directors, board members, officials, 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 ~~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,~~

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~~a~~ any such claim, damage, loss or expense (these are collectively referred to as "claims") is caused by or alleged to be caused by an act or omission of Contractor, any Subcontractor, anyone directly or indirectly employed by ~~them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense~~ any of them or anyone for whose acts any of them may be liable in the performance of the Agreement, regardless of whether or not 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 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.

§ 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.

§ 3.18.5 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 hereby knowingly and intentionally waives the right to assert that Contractor's liability may be limited to the amount of its statutory liability under the Workers' Compensation Act, and agrees that Contractor's liability to indemnify and defend the Owner and Architect is not so limited. The Contractor shall include this provision in each of its Subcontract agreements and shall require its Subcontractors to be so bound.

§ 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

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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 Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect whose status under the Contract Documents shall be that of the Architect.

§ 4.1.4 The Architect's and its 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 the Contract Documents, whichever is earlier. Any services required of the Architect and its 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

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

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the ~~portion of the~~ Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols. 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 may be requested 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 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. The Contractor shall 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 order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

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§ 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~~ Section 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. The 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 the warranties 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 Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will 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.

§ 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 the subcontractors of a Separate Contractor.

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

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

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

§ 5.2.1.1 In addition to the information which may be required prior to the award of the Project, not later than twenty-one (21) days after Notice of Award of the Project, the Contractor shall furnish to the Owner through the

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

§ 5.3.1 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

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.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of ~~subrogation.~~
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 any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

~~**§ 6.1.4** Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.1.4 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 schedule 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 7.3.7.1 through 7.3.7.5.

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.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 Owner 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 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and

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profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 ~~Costs~~ Actual costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

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

.3 ~~Rental~~ Actual rental 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, directly related to the change; and

.5 ~~Costs~~ 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.

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

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

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. ~~Such agreement shall be effective immediately and shall be recorded as a Change Order.~~ Upon resolution of exact scope, Contract Sum change, and Contract Time change, a Change Order shall be prepared incorporating the Construction Change Directive.

§ 7.3.8 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 computed in accordance with Section 7.3.4 shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net ~~increase,~~ 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 additive Change Orders.

§ 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.

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

§ 7.5 SUBSTITUTIONS

After the award of the Project, 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, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor shall bear all additional costs incurred to meet the Contract Time, which may require working overtime without additional compensation.

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§ 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, 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 (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner ~~pending mediation and binding dispute resolution;~~ or by other causes which the Architect and Owner determine, in their sole discretion, or (5) by other causes that the Contractor asserts, and the Owner Architect determines, justify delay, then the Contract Time shall be extended 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 ~~This Section 8.3~~ 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

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

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

§ 9.2 Schedule of Values

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

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§ 9.3 Applications for Payment

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

§ 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. The 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, suppliers, or other persons or entities that 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.

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§ 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 (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

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

.1 defective Work not remedied;

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

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

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

.5 damage to the Owner or a Separate Contractor;

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

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

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment ~~under Section 9.5.1~~, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

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

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

§ 9.6.5 ~~The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.~~ Intentionally Deleted.

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both,

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under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

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

§ 9.7 Failure of Payment

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

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

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

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~~§ 9.9 Partial Occupancy or Use~~

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

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

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

§ 9.10 Final Completion and Final Payment

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

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

~~§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.~~

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

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~~.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;~~
~~.2 failure of the Work to comply with the requirements of the Contract Documents;~~
~~.3 terms of special warranties required by the Contract Documents; or~~
~~.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.~~

§ 9.10.5 Acceptance of final payment by the Contractor, a ~~Subcontractor, or a supplier,~~ 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 Date for each Phase of the Work. This responsibility includes all work of the Contractor and that of its Subcontractors and suppliers. The Contractor acknowledges that the Owner will suffer significant financial loss, and there will be disruption to the School Corporation community, 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 School Corporation community would not be susceptible to precise calculation. To protect the Owner against said loss and disruption to the School Corporation community and not as a penalty, 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 as per the Liquidated Damages Sliding Scale below for each calendar day of delay, per each School campus, per Phase in Substantial Completion. Substantial Completion for the Project refers to all scheduled work being a minimum 99% complete.

LIQUIDATED DAMAGES SLIDING SCALE

Original Awarded Bid Cost	Liquidated Damages per Calendar Day
$0 - $499,999.99	$500
$500,000.00 - $999,999.99	$600
$1,000,000.00 - $3,999,999.99	$700
$4,000,000.00 - $7,999,999.99	$800
$8,000,000.00 - $11,999,999.99	$900
$12,000,000.00 - $19,999,999.99	$1,000
$20,000,000.00 - Above	$1,500

§ 9.11.2 Payments of Liquidated Damages are in addition to other direct 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, a Subcontractor, or a Sub-subcontractor; and

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

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

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

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

§ 10.2.5 The Contractor ~~shall~~ 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. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

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

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ~~21~~ twenty-one (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 and Substances

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

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

§ 10.3.3 ~~To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.~~ Intentionally Deleted.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the ~~site unless such materials or substances are required by the Contract Documents.~~ site. The

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Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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

~~**§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.~~

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

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

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

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

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

§ 11.2 Owner's Insurance

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

§ 11.2.1. 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.

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§ 11.2.2 ~~Failure to Purchase Required Property Insurance.~~ ~~If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~ 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 ~~Notice of Cancellation or Expiration of Owner's Required Property Insurance.~~ ~~Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.~~ 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 Builder's Risk Insurance is required and shall be purchased and maintained by the Owner until Substantial Completion.

§ 11.3.1.1 The policy required by this Section 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 Coverage under the policy required by this Section 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 Coverage under the policy required by this Section shall not extend to:

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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.

§ 11.3.1.5 The policy required by this Section 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 Waivers of Subrogation

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

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

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

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

§11.5 Adjustment and Settlement of Insured Loss

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After ~~Substantial~~ 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 any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor ~~shall~~ shall, at Contractor's sole cost and expense, correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after ~~Substantial~~ 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 or warranties provided or referred to by this Article 12, the warranty or guarantee period shall begin anew from the date of the completion or correction of such Work.

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract ~~Documents.~~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, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~
State 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 an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

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

§ 13.3 Rights and Remedies

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

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

§ 13.3.3 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.

§ 13.3.4 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.

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§ 13.4 Tests and Inspections

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

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, ~~except as provided in Section 13.4.3,~~ shall be at the ~~Owner's~~ Contractor's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense. 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.

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

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

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

§ 13.5 Interest

~~Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~Any references in this Agreement to interest being assessed against the Owner are hereby deleted.

§ 13.7 REGULATIONS

§ 13.7.1 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

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regard to any compliance with the applicable laws, rules and regulations referenced herein. No plea of misunderstanding or ignorance thereof will be considered.

§ 13.7.1.1 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.

§ 13.7.2 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.

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

§ 13.7.3.2.1 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.

§ 13.7.3.2.2 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.

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

7§ 13.7.17 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.

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ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

Intentionally Deleted. .3.

~~§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:~~

- ~~.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;~~
- ~~.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;~~
- ~~.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or~~
- ~~.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~

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

~~§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.~~

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

§ 14.2 Termination by the Owner for Cause

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

- ~~.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;~~
- ~~.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;~~
- ~~.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or~~
- ~~.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.~~ 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

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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 reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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

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

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

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

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds ~~costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the~~ 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 subcontracts, any additional interest or fees which the Owner must pay by reason of a delay in the 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.

§ 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.

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§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties to the Contract seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

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

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in ~~Section 15.1.3 shall be given. The Contractor's Claim~~ herein shall be 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~~ claim is necessary.

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

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor ~~and Owner waive Claims against each other~~ 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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

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

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

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

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

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

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

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

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

~~**§ 15.3 Mediation**~~

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

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

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

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

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~~§ 15.4 Arbitration~~

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

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

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

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

~~§ 15.4.4 Consolidation or Joinder~~

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

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

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 those of the Owner and Contractor under this Agreement.~~

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DRAFT AIA® Document A101™ – 2017 Exhibit A

Insurance and Bonds

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

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

« Duneland School Corporation - General »
« »

THE OWNER:
(Name, legal status and address)

« Duneland School Corporation »« »
«601 West Morgan Avenue
Chesterton, Indiana 46304 »

THE CONTRACTOR:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The ~~Owner and~~ Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this ~~Exhibit.~~ Exhibit from companies lawfully authorized to do business in the jurisdiction in which the Project is located. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

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

§ A.2.2 Liability Insurance

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.

This document is intended to be used in conjunction with AIA Document A201™-2017, General Conditions of the Contract for Construction. Article 11 of A201™-2017 contains additional insurance provisions.

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

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. ~~This insurance shall include the interests of mortgagees as loss payees.~~The policy shall be based on a $5,000 deductible, applicable to all losses for each occurrence. The Contractor shall be solely response for any and all losses up to $5,000 per loss. Losses are payable to the Owner for Owner's own account.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, ~~or windstorm.~~ and debris removal including demolition occasioned by enforcement of any legal requirements, or windstorm and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of an insured loss. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A2.3.1.2.1 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.

§ A2.3.1.2.2 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.

§ A2.3.1.2.3 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

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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.

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured ~~Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.~~Retentions.. The policy shall be based on a $5,000 deductible, applicable to all losses for each occurrence. The Contractor shall be solely response for any and all losses up to $5,000 per loss. Losses are payable to the Owner for Owner's own account.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The ~~Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.~~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.

§ A.2.3.3 Insurance for Existing Structures
If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.
The Owner shall purchase and maintain the insurance selected and described below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[« »] § A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

« »

[« »] § A.2.4.2 Ordinance or Law Insurance, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

« »

[« »] § A.2.4.3 Expediting Cost Insurance, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

« »

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[« »] § A.2.4.4 Extra Expense Insurance, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

« »

[« »] § A.2.4.5 Civil Authority Insurance, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

« »

[« »] § A.2.4.6 Ingress/Egress Insurance, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

« »

[« »] § A.2.4.7 Soft Costs Insurance, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

« »

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[« »] § A.2.5.1 Cyber Security Insurance for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. *(Indicate applicable limits of coverage or other conditions in the fill point below.)*

« »

[« »] § A.2.5.2 Other Insurance

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

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

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

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

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04. The Contractor shall also cause the automobile liability policy to include the Owner, the Architect and the Architect's consultants as additional insureds.

§ A.3.2 Contractor's Required Insurance Coverage

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

«Coverages shall be maintained without interruption from date of commencement of the Work until 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 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 »

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than «One Million Dollars » ($ «1,000,000 ») each occurrence, «Two Million Dollars » ($ «2,000,000 ») general aggregate, and «One Million Dollars » ($ «1,000,000 ») aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;

.2 personal injury and advertising injury;

.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;

.4 bodily injury or property damage arising out of completed operations; and

.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

.6 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 to be maintained for two (2) years after Final Completion.

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

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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 officers, directors, board members, officials, 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.

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

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.

.3 Claims for bodily injury other than to employees of the insured.

.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.

.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.

.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.

.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.

.8 Claims related to roofing, if the Work involves roofing.

.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

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

§ A.3.2.4 ~~The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.~~Umbrella Excess Liability insurance in the amount of Two Million Dollars ($2,000,000) over commercial general liability insurance, automobile liability insurance and Employer's Liability insurance.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than «One Million Dollars » ($ «1,000,000 ») ~~each accident,~~ «One Million Dollars » ($ «1,000,000 ») each employee, and «One Million Dollars » ($ «1,000,000 ») policy limit.

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

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than «One Million Dollars » ($ «1,000,000 ») per claim and «One Million Dollars » ($ «1,000,000 ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than «One Million Dollars » ($ «1,000,000 ») per claim and «One Million Dollars » ($ «1,000,000 ») in the aggregate.

~~§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than ($) per claim and ($) in the aggregate.~~

~~§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.~~

~~§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.~~

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

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

« The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Agreement and that will protect the Owner and the Architect and their respective officers, directors, board members, its 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 arising (a) out of or resulting from 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 or to destruction of tangible property (other than the work itself) including the loss of use resulting therefrom and (b) out of any claim made by any employee of the contractor or any subcontractor or by the Illinois Department of Labor for the amount of any wages or salaries which should have been paid to such employees and interest thereon, fines or other assessments relating to such violation, pursuant to provisions of the Prevailing Wage Act, 820 ILCS 130/0.01 et seq., regardless of whether or not it is caused in part by a party to whom insurance is afforded pursuant to this department. »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

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

[« »] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall

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adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

« »

[« »] § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

[« »] § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[« »] § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[« »] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[« »] § A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.3.3 Other Insurance Requirements

§ A3.3.3.1 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 of the Contractor by this Exhibit A 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 this Exhibit A. 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.

§ A3.3.3.2 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.

§ A3.3.3.3 The Contractor shall name the Owner and the Architect and each of their respective officers, directors, officials, board members, agents and employees as additional insureds on the Contractor's general liability policy for claims arising from the Contractor's operations, the automobile liability policy and the excess/ umbrella liability policy. The foregoing policies shall be endorsed to be primary over any other insurance which the additional insureds may have and shall contain a severability of interests clause. The Contractor shall require each of its subcontractors to comply with the requirements of this Section A3.3.3.3.

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§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is ~~located,~~ located with a A.M. Best rating of "A" and with a surety company for which the Owner has no objection. The Contractor's performance bond and labor and materials payment bond shall be in the amount of one hundred percent (100%) of the Contract Sum, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	See above.
Performance Bond	See above.

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

§ A3.4.1 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.

§ A3.4.2 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 Illinois and approved by the Owner.

§ A3.4.3 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.

§ 3.4.5 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.

§ A3.4.6 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.

§ A3.4.7 The Contractor must within ten (10) days after the execution of this Agreement furnish a Performance 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 Illinois, 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 Illinois. 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.

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§ A3.4.8 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.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

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

§ A.4.1 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.~~

»

DRAFT

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SECTION 01100

SUMMARY

PART 1 – GENERAL

1.1 PROJECT

A. Project Name: 2020 Nurse's Office Renovation at: Bailly Elementary School.
B. Owner's Name: Duneland School Corporation.
C. The Project consists of the renovation of nurse's office and toilet room.
    1. Including:
        a. Flooring
        b. Ceilings and Lights
        c. Wood Doors and Steel Frames
        d. Casework
        e. Masonry
        f. Mechanical
        g. Electrical
        h. Plumbing

1.2 CONTRACT DESCRIPTION

A. Work covered by Contract Documents: As defined in 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 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 contractor shall be responsible for paying and securing all permits, governmental fees and licenses other than primary building permit necessary for the proper execution and completion of the Project.
C. 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.

D. The contractor shall coordinate and have completed all inspections required by public authorities relating to the performance of the work under the Contract Documents including, but not limited to:
   1. Illinois Department of Public Health (IDPH) for all rough-in and final inspections of plumbing and food service work, as required.
   2. All inspections required in Section 01400 to be performed by a Testing and Inspection Agency.
E. 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
F. 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 3, 3020, 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 4, 2020, 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. No time restrictions will be implemented. However, at any time, the Owner may choose to restrict work hours if the Owner/District feels the contractor is causing disruption.
   2. Note: Village/Town noise ordinance (call to verify times).

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.

1.8 SUBSTANCE ABUSE PREVENTION POLICY

A. Pursuant to the Substance Abuse Prevention on Public Works Act (820 IL CS 265/1, et seq.), employees of the contractor and employees of the contractor and employees of any subcontractor are prohibited from the use of drugs or alcohol , as defined in the Act, while performing on any public works project.
B. The contractor and any subcontractor shall file with the public body engaged in the construction of the public works: a copy of the substance abuse prevention program along with a cover letter certifying that their program meets the requirements of the Act or a letter certifying that the contractor or subcontractor has a collective bargaining agreement in effect dealing with the subject matter of this Act. A certification form is attached and must be completed by the contractor and each subcontractor to this contract.

1.9 WORK SEQUENCE

A. Construction services as specified herein shall commence upon issuance of the Letter of Intent to Award a Construction Contract.
B. 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 retainage 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 CERTIFIED PAYROLL FOR PUBLIC WORKS PROJECTS

A. Effective August 10, 2005 the Public Act 94-0515 amended the Prevailing Wage Act., all contractors and their subcontractors who are engaged in public works projects must provide a certified monthly payroll report either in person, by mail or electrically for the Owner's records.

B. Each Contractor or Subcontractor performing Work on this Project shall comply in all respects with all laws governing the employment of Labor, Social Security, and Unemployment Insurance of both the State and Federal government. There shall be paid to each employee engaged in Work under this Contract at the site of the Project, no less than the minimum wage for the classifications of labor employed in compliance with 820 ILCS 130/1 et seq. as now existing or hereafter amended.

C. In accordance with 820 ILCS 130/5, the Contractor and each subcontractor shall make and keep, for a period of not less than 3 years, records of all laborers, mechanics, and other workers employed by them on the Project; the records shall include each worker's name, address, telephone number, social security number, classification or classifications, the hourly wages paid in each period, the number of hours worked each day, and the starting and ending times of each work day.

D. The Contractor and each subcontractor shall submit monthly, in person, by mail, or electronically a certified payroll to the District. The certified payroll shall consist of a complete copy of the records. The certified payroll shall be accompanied by a statement signed by the contractor or subcontractor which avers that:
   1. such records are true and accurate;
   2. the hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required; and
   3. the contractor or subcontractor is aware that filing a certified payroll that he or she knows to be false is a class B misdemeanor.

E. Upon 2 business days notice, the contractor and each subcontractor shall make available for inspection for the records to the District, its officers and agents, and to the Director of Labor and his deputies and agents at all reasonable hours at a location within the State. The Contractor and each subcontractor shall permit his/her employees to be interviewed on the job, during working hours, by compliance investigators of the Department or the Department of Labor.

1.6 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 in accord with Public Act 85-1295. When required on public work--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.

1.7 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.

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. Costs Included in cash allowances:
   1. Allowances shall cover the cost to the Contractor of materials and equipment delivered to the site and all required taxes, less applicable trade discounts.
   2. Contractor's costs for unloading and handling at the site, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Base Proposal and not in the allowances.

SECTION 01210

ALLOWANCES

1.7 INSPECTION AND TESTING ALLOWANCES

A. Costs Included in Inspecting and Testing Allowances: Cost of engaging the inspecting or testing agency of record; execution of inspecting and tests; and reporting results.

B. Costs Not Included in the Inspecting and Testing Allowances:
   1. Costs of testing services used by Contractor separate from Contract Document requirements.
   2. Costs of testing services used by the Contractor from a source other than the testing agency of record.
   3. Costs of retesting upon failure of previous tests as determined by Architect.
   4. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.

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 the sum/price of $5,000 for use upon Owner's instructions.

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 produced by an experienced photographer, acceptable to Architect.
B. Submit samples of Photographer's work on similar projects if required by Architects.
C. Take photographs on the first day of each month and as follows:
   1. Site clearing.
   2. Excavations.
   3. Foundations.
   4. Structural framing.
   5. Enclosure of building.
   6. Final completion.
D. Take photographs as evidence of existing project conditions as follows:
   1. Interior views
   2. Exterior views
E. Views:
   1. Provide aerial photographs from four cardinal views at each specified time, until structure is enclosed.
   2. Provide non-aerial photographs from four cardinal views at each specified time, until Date of Substantial Completion.
   3. Consult with Architect for instructions on views required.
   4. Provide factual presentation.
   5. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
F. Prints: Full color; three prints of each view.
   1. Matte; smooth texture; white tint; single weight; contrast grade 4, extra hard.
   2. Size: 8 x 10 inch; mounted for binder and tabs.

3. Identify each print on back. Identify name of Project, contract number, phase, orientation of view, date and time of view, name and address of photographer, and photographer's numbered identification of exposure.

G. Deliver prints with each Application for Payment with transmittal letter specified in this Section.
H. Deliver one set of prints each to Architect and Project record documents file.
I. Negatives remain property of photographer. Require that photographer maintain negatives for 5 years from Date of Substantial Completion.

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.
   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. Testing and Inspection Agencies.
G. 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

1.5 TESTING AND INSPECTION AGENCIES

A. Contractor will employ and pay for services, from Testing Allowances, of an independent testing agency to perform specified testing and inspection.
B. Testing Agency of record: The Testing Agency of Record shall be identified by the Owner within 15 days of the Letter of Intent.
C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
D. Inspection sampling and testing is required for:
   1. Section: 02316; Fill and Backfill.
   2. Section: 03200; Concrete Reinforcement.
   3. Section: 03300; Cast-in-Place Concrete.
   4. Section: 04065; Mortar and Masonry Grout.
   5. Section: 05120; Structural Steel.
E. Additional services as requested by Architect
F. Testing Agency:
   1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 548, ASTM E 543, ASTM C 1021, ASTM C 1077, ASTM C 1093, and ASTM C 1021.
   2. Inspection agency: Comply with requirements of ASTM D290.
   3. Laboratory: Authorized to operate in State in which Project is located.
   4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

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 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.
B. Testing Agency Duties:
    1. Test samples of mixes submitted by Contractor.
    2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
    3. Acquaint Architect's personnel with testing procedures and with all special conditions encountered at the site.
    4. Perform specified inspections, sampling and testing of products in accordance with specified standards.
    5. Ascertain compliance of materials and mixes with requirements of Contract Documents.
    6. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
    7. Perform additional tests and inspections required by Architect.
    8. Attend preconstruction meetings and progress meetings as directed by Architect.
    9. Submit reports of all tests/inspections specified.
    10. Obtain written acknowledgement of each inspection, sampling and test made from subcontractor whose work is being tested.
C. Limits on Testing/Inspection Agency Authority:
    1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
    2. Agency may not approve or accept any portion of the Work.
    3. Agency may not assume any duties of Contractor.
    4. Agency has no authority to stop the Work.
D. Contractor Responsibilities:
    1. Provide to agency at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
    2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
        a. Monitor or direct superintendent to monitor each inspection, sampling and test.
        b. Provide laboratory with written acknowledgement of each inspection, sampling or test.
        c. Within 24 hours notify Architect in writing of reasons for not acknowledging laboratory field procedures.
    3. Furnish copies of mill test reports.
    4. Furnish verification of compliance with contract requirements for materials and equipment
    5. Provide incidental labor and facilities:
        a. To provide access to Work to be tested/inspected.
        b. To obtain and handle samples at the site or at source of Products to be tested/inspected.

c. To facilitate tests/inspections.
d. To provide storage and curing of test samples.

6. Notify Architect and laboratory 48 hours prior to expected time for operations requiring testing/inspection services.
7. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
8. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
9. Correct work which is defective or which fails to conform to the Contract Documents in accordance with the General conditions. Corrective work shall not delay the project schedule or the work of other subcontractors.
10. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.5 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.

3.6 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 utilities.
B. Temporary telephone and facsimile service.
C. Temporary sanitary facilities.
D. Temporary Controls: Barriers, enclosures, and fencing.
E. Waste removal facilities and services.

1.2 RELATED SECTIONS
A. Section 01510 - Temporary Utilities.

1.3 TEMPORARY UTILITIES
A. Refer to Section 01510 – Temporary Utilities for additional information
B. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
C. Existing facilities may not be used.
D. New permanent facilities may be used.

1.4 TELEPHONE SERVICE
A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.
B. Provide, maintain and pay for facsimile service and a dedicated telephone line to field office at time of project mobilization.

1.5 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 not permitted.
F. New permanent facilities may be used during construction operations.
G. Maintain daily in clean and sanitary condition.
H. At end of construction, return facilities to same or better condition as originally found.

1.6 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.
E. Control surface water to prevent damage to the project, the site or adjoining properties. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface water.
F. Dispose of drainage water in a manner to prevent flooding, erosion, silting, or runoff of silt or sediment or other damage to all portions of the site or to adjoining areas.
G. Provide rodent control to prevent infestation of construction or storage areas. Employ methods and use materials which will not adversely affect condition at the site or on adjoining properties.
H. When the use of rodenticides is deemed necessary, submit a copy of proposed program to Architect with a copy to the Owner. Clearly indicate:
    1. Areas to be treated.

2. Rodenticides to be used, with copy of manufacturer's current printed instructions.
3. Pollution preventative measures to be employed.

I. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow waste disposal areas, to prevent erosion and sedimentation.

J. Construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode. Periodically inspect earthwork to detect evidence of the start of erosion. Apply corrective measures to control erosion.

1.7 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.

1.8 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.

1.9 INTERIOR ENCLOSURES

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

1.10 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.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion.
B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
C. Clean and repair damage caused by installation or use of temporary work.
D. Restore existing facilities used during construction to original condition.
E. Restore new permanent facilities used during construction to specified condition.
F. Grade site areas affected by temporary installations to indicated elevations and slopes, and clean the area.
G. 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 01510

TEMPORARY UTILITIES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

1.2 RELATED SECTIONS
A. Section 01500 - Temporary Facilities and Controls: Telephone service for administrative purposes.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES
A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
C. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.
D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
E. Maintain lighting and provide routine repairs. Equip all lamps with guards.
F. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING
A. Cost of Energy: By Contractor.
B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
   1. Temporary heating shall be smokeless portable space heaters of type approved by UL, Factory Mutual, the Fire Marshal or other governing authorities.
C. Maintain minimum ambient temperature of 45 degrees F at surfaces where construction is in progress, unless indicated otherwise in specifications.
D. Existing facilities shall not be used.

1.5 TEMPORARY COOLING
A. Cost of Energy: By Contractor.
B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
C. Maintain maximum ambient temperature of 85 degrees F at surfaces where construction is in progress, unless indicated otherwise in specifications.
D. Existing facilities shall not be used.
E. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.6 TEMPORARY VENTILATION
A. Existing ventilation equipment may not be used.

1.7 TEMPORARY WATER SERVICE
A. Cost of Water Used: By Contractor.
B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
C. Connect to existing water source.
   1. Exercise measures to conserve water.
   2. Provide separate metering and reimburse Owner for cost of water used.
D. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

E. If required, provide a house pump complete with necessary operating controls, starters and switches, to supply adequate capacity with minimum 20 lb. pressure at each outlet.
   1. Do not use pumps specified for permanent installation.

1.8 PERMANENT SYSTEM USED AS TEMPORARY FACILITIES

A. When any portions of the Permanent Systems are in operating condition, that part of the system may be used as a temporary facility, provided that the Contractor:
   1. Obtains the Architect's written approval.
   2. Assumes full responsibility for the system used.
   3. Pays all costs for operation, maintenance, cleaning, and restoration of the system.
   4. Operates the system under the supervision of the subcontractors' responsible for the systems installation and ultimate performance.
   5. Operates the Air Circulating System without refrigeration or chilling and:
      a. Provides temporary approved filters within the fan enclosure to adequately filter air being distributed through the ductwork to the supply outlets.
      b. Places disposable filters in front of the exhaust registers to keep construction dirt out of exhaust ductwork.
      c. Clean all ductwork upon completion of temporary use.
   6. Pay all costs for fuel and energy consumed. Upon receipt of the Certificate of Substantial Completion arrange with utility companies to make a final reading of meters. Submit a copy of meter readings to Owner.

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 Proposers: Product options and substitution procedures prior to proposal 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 proposals 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 Proposers specify time restrictions for submitting requests for substitutions during the proposal 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, Proposal/Contractor Options
   1. Prior to Proposal Opening: The Architect will consider written requests to amend the proposal documents to add products not specified provided such requests are received at least 10 calendar days prior to proposal 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 proposal opening.
   2. With Proposal: A proposer may propose substitutions with his proposal by completing the Substitution Sheet with the Proposal Form, subject to the provisions stated thereon. Architect will review Substitution Sheet of low proposer 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 Proposer/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. Surveying for laying out the work.
E. Cleaning and protection.
F. Starting of systems and equipment.
G. Demonstration and instruction of Owner personnel.
H. 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 15950 - 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 GRADES, LINES AND LEVELS

A. Contractor lay out all of the work under this contract.
1. Establish all working lines, levels, elevations and measurements.

B. Owner will furnish:
1. A certified topographic survey of existing site, giving all grades and lines of streets, alleys, pavements and adjoining property, rights-of-way, encroachments, boundaries and contours of building site.
2. Locations, dimensions and data pertaining to existing:
a. Buildings.
b. Underground obstructions.
c. Trees and landscaping.
d. Other improvements.
3. Information as to available service and utility lines, both public and private.

C. Location of survey's baseline control points.
1. Benchmark and temporary benchmark location and elevation of each.

D. Quality Assurance
1. All layout work which establishes site layout dimensions or elevations or exterior building dimensions, angles or grade floor elevations shall be done by a qualified engineer or surveyor.
2. Qualifications of Contractor's Engineer/Surveyor:
a. Experienced in layout work of similar complexity.
b. Licensed by State of Illinois.

E. Submittals. Architect may at any time require written verification of grades, lines and levels by a licensed surveyor as work progresses.

F. Laying Out The Work
1. Prior to the beginning of the actual work, perform the following:
a. Each subcontractor shall lay out their portion of the work.
b. Establish all required bench marks and reference lines.
c. Verify all building dimensions.
d. Verify conformance of all actual general dimensions with those indicated on the Architect's plan.
e. Notify the Architect immediately if any conflict whatsoever exists.

G. Survey Upon Completion
1. Upon completion, Owner may provide a survey performed by a licensed surveyor indicating the location of the Work of this Contract and including the following data:
a. Building location and dimensions of all walls.
b. Elevations of finished floor at all exterior exits.
c. Spot elevations, storm, sanitary and watermain manholes, and all invert elevations.
d. Spot elevations of corners of all new pavement and on a 50' grid within paved areas.
2. All areas found to be non-conforming to the Contract Documents shall be corrected by the responsible Contractor.

SECTION 01700

EXECUTION REQUIREMENTS

1.5 QUALIFICATIONS

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

1.6 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.
E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
    1. Minimize amount of bare soil exposed at one time.
    2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
    3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
    4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
G. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
I. 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.

1.7 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 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.
B. Promptly notify Architect of any discrepancies discovered.
C. Contractor shall locate and protect survey control and reference points.
D. Control datum for survey is that established by Owner provided survey.
E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
H. Utilize recognized engineering survey practices.
I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
    1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
    2. Grid or axis for structures.
    3. Building foundation, column locations, and ground floor elevations.
K. Periodically verify layouts by same means.
L. Maintain a complete and accurate log of control and survey work as it progresses.
M. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 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.

3.10 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. 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.
F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.
H. Air and Water Testing, Adjusting and Balancing
    1. Testing, adjusting and balancing will be part of the mechanical contract.
    2. The mechanical subcontractor will perform services specified in Division 15.
    3. Reports will be submitted by the Mechanical subcontractor 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.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.
B. Testing, adjusting, and balancing HVAC systems: See Section 15950 and 01400.

3.12 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.

3.13 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.

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 two 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 District to the general contractor, all warranties should include the verbiage "…for a period of (X) year(s) after the date The District 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.
T. Completed Work Survey: Requirements specified in Section 01700 - Execution Requirements.

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 two 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 two 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 02316

FILL AND BACKFILL

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Filling, backfilling, and compacting for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, and utilities within the building.
B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.2 RELATED SECTIONS
A. Section 03300 - Cast-In-Place Concrete.

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction.
C. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
D. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).
E. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
F. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
G. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
I. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS
A. Finish Grade Elevations: Indicated on drawings.
B. Subgrade Elevations: 6 inches below finish grade elevations indicated on drawings, unless otherwise indicated.
C. SOIL MATERIALS:
   1. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
   2. Satisfactory Soil Materials: ASTM D2487 soil classification groups CL, GC GW, GP, GM, SW, SP, SC and SM, free of rock or gravel larger than 2 inches (50 mm) in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter and as per AASHTO T180 and IDOT references above.
   3. Unsatisfactory Soil Materials: ASTM D2487 soil classification groups ML, MH, CH, OL, OH and PT and as per AASHTO T180 and IDOT references above.
   4. Subsoil Structural Fill: Select site excavated subsoil or approved off-site imported inorganic materials meeting the following requirements:
      a. Graded
      b. Free of lumps or rocks greater than three inches in size.
      c. Free of roots and other organic materials.
      d. Conforming to ASTM D2487 group symbol CL.

1.5 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Samples: 5 lb sample of each type of fill; submit in air-tight containers to testing laboratory.
C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
   1. Test Reports: In addition to test reports required under field quality control, submit the following:

a. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrowed sources.
b. One optimum moisture-maximum density curve for each soil material.
c. Report of actual unconfined compressive strength and/or results of bearing tests.

D. Compaction Density Test Reports.

1.6 PROJECT CONDITIONS

A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.
C. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 – PRODUCTS

2.1 FILL MATERIALS

A. General Fill: Satisfactory soil materials as noted in definitions above from Subsoil excavated on-site or from off-site source.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches except where permitted by sieve analysis, and debris.
   3. Free from all organic materials, roots, black dirt, shale and chert.
B. Structural Granular Fill - Fill Type IDOT Designation CA-1: Angular crushed stone, conforming to Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, Latest Edition. Free from Chats, Slag of any designation, Chert, Pit or Bank Run materials and Novaculite Gravel.
   1. CA-1 Composition passing sieve size and percentage under ASTM C 136: 3 inch 95 ± 5 %; 2 inch 60 ± 15 %; 1-1/2 inch, 50 ± 15; 1 inch, 3 ± 3 %.
   2. Free of organic material.
C. Concrete for Fill: Lean concrete.
D. Graded Granular Fill - Fill Type IDOT Designation CA-6: Angular crushed stone, conforming to Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, Latest Edition. Free from Chats, Slag of any designation, Chert, Pit or Bank Run materials and Novaculite Gravel.
   1. CA-6 Composition passing sieve size and percentage under ASTM C 136: 1-1/2 inch, 100% ; 1 inch, 95 ± 5 % ; 1/2 inch, 75 ± 15%; No. 4 , 43 ± 13%; No. 16, 25 ± 15; No. 200 8 ± 4%
E. Open Granular Fill - Fill Type IDOT Designation CA-7: Angular crushed stone; free of shale, clay, friable material and debris. Conforming to Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, Latest Edition. Free from Chats, Slag of any designation, Chert, Pit or Bank Run materials and Novaculite Gravel.
   1. CA-7 Composition passing sieve size and percentage under ASTM C 136: 1-1/2 inch, 100%; 1 inch, 95 ± 5 %; 1/2 inch, 45 ± 15%; No. 4, 5 ± 5%.
F. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter conforming to IDOT designation FA-1.
G. Topsoil – Fill: Topsoil excavated on-site or from off-site borrow.
   1. Graded and pulverized.
   2. Free of roots, rocks larger than 1/4 inch, subsoil, debris, large weeds and foreign matter.
   3. Conforming to ASTM D2487 Group Symbol OH.

2.2 ACCESSORIES

A. Geotextile Fabric: Non-biodegradable, woven conforming to IDOT Standard Specification for Road and Bridge Construction for intended use.

2.3 SOURCE QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for testing and analysis of soil material.
B. If tests indicate materials do not meet specified requirements, change material and retest.
C. Provide materials of each type from same source throughout the Work.
D. CA-7 shall NOT be substituted for CA-6 without exception. CA-7 is not considered to be a self compacting material and must be compacted to meet or exceed project requirements.
E. Pea gravel shall not be substituted for FA-1 or any other aggregate material without express written permission of the Architect of Record--consultant approval is not sufficient.
F. The use of bank run, spherical aggregates, or other unspecified aggregate materials is strictly prohibited. No substitution shall be permitted.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.
B. See Section 02310 for additional requirements.
C. Verify subdrainage, damp proofing, or waterproofing installation has been inspected.
D. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.
B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill and recompact.
C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
D. If density or compaction requirements for subgrade can not be achieved, disc, aerate and recompact subgrade for a minimum depth of 10 inches.
E. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.3 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.
B. Employ a placement method that does not disturb or damage other work.
C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
D. Maintain optimum moisture content of fill materials to attain required compaction density.
E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
F. General Fill: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.
G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
H. Correct areas that are over-excavated.
    1. Other areas: Use fill required at specific location, flush to required elevation, compacted to minimum 95 percent Modified Proctor.
I. Compaction Density Unless Otherwise Specified or Indicated: As listed in Fill at Specific Locations.
J. Reshape and re-compact fills subjected to vehicular traffic.

3.4 FILL AT SPECIFIC LOCATIONS

A. Structural Fill at areas designated by Architect/Engineer:
    1. Use Fill Type CA-1.
    2. Maximum depth per lift: 6 inches, compacted.
    3. Compact to minimum 95 percent Modified Proctor.

B. Under Interior Slabs-On-Grade:
   1. Use graded Fill Type CA-6.
   2. Depth: minimum 6 inches compacted.
   3. Compact to 95 percent Modified Proctor.
C. At Foundation Walls, Footings, and foundation related items:
   1. Use Fill Type CA-6.
   2. Fill up to subgrade elevation.
   3. Maximum depth per lift: 12 inches, compacted.
   4. Compact each lift to 95 percent Modified Proctor.
   5. Do not backfill against unsupported foundation walls.
   6. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
D. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
   1. Bedding: Use open granular Fill Type CA-7. Fill to cover piping maximum of 18 inches above top edge of pipe or other items unless otherwise noted.
      a. Cover drainage piping with CA-7 for maximum 18 inches.
      b. Fill up to subgrade elevation with graded granular CA-6 in lifts not to exceed 8 compacted inches.
   2. Compact to 95 percent Modified Proctor.
E. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches except small diameter (2 inches or less) Polypropylene, Polyvinyl-flouridiene, polyethylene, polybutylene, and Chlorinated Polyvinyl Chloride (CPVC) piping where manufacturer does not permit angular stone:
   1. Under all paved areas and within 3 feet of paving:
      a. Bedding: Use Fill Type CA-7. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
      b. Cover with Fill Type CA-6.
      c. Fill up to subgrade elevation.
      d. Compact in maximum 8 inch lifts to 95 percent Modified Proctor.
   2. Under all landscaped areas:
      a. Bedding: Use Fill Type CA-7. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
      b. Cover with general fill.
      c. Fill up to subgrade elevation.
      d. Compact in maximum 12 inch lifts to 85 percent Modified Proctor.
F. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches where small diameter (2 inches or less) Polypropylene, Polyvinyl-flouridiene, polyethylene, polybutylene, and Chlorinated Polyvinyl Chloride (CPVC) piping is present and the manufacturer does not permit angular stone:
   1. Under all paved areas and within 3 feet of paving:
      a. Bedding: Use Fill Type FA-1. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted. Consolidate sand prior to placing CA-6 without restricting piping below.
      b. Cover with Fill Type CA-6.
      c. Fill up to subgrade elevation.
      d. Compact in maximum 12 inch lifts to 95 percent Modified Proctor at surface.
   2. Under all landscaped areas:
      a. Bedding: Use Fill Type FA-1. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
      b. Cover with general fill.
      c. Fill up to subgrade elevation.
      d. Compact in maximum 12 inch lifts to 85 percent Modified Proctor.
G. Base material under all paved areas:
   1. Use Fill Type CA-6.
   2. Depth: minimum as indicated on Drawings.
   3. Compact in maximum 6 inch lifts to 95 percent Modified Proctor.

H. At Lawn Areas:
   1. Use general fill.
   2. Fill up to 6 inches below finish grade elevations.
   3. Compact to 85 percent Modified Proctor.
   4. See Section 02310 for topsoil placement.
I. Around all Underground structures unless otherwise noted:
   1. Bedding: CA-7 Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
   2. Cover with Fill Type CA-6.
   3. Fill up to subgrade elevation.
   4. Maximum compacted depth of each lift: 8 inches.
   5. Compact to 95 percent Modified Proctor.

3.5 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.
B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
E. Frequency of Tests: 1 for each 2000 SF or fraction thereof per lift.
F. Proof roll compacted fill at surfaces that will be under paving in the presence of the Testing Agency, Owner, Architect and local municipality. Proof roll with fully loaded 6-wheel dump truck. Areas with 1 inch deflection or greater shall be scarified, aerated, dried, recompacted and retested. Contractor has the option to replace material in lieu of scarification, aeration, drying and recompaction at no cost to the owner.

3.7 CLEAN UP

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water. Restore any vegetation to original condition.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
B. Openings for other work.
C. Form accessories.
D. Form stripping.

1.2 RELATED DECTIONS
A. Section 03200 - Concrete Reinforcement.
B. Section 03300 - Cast-In-Place Concrete.

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
D. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International.
E. ACI 347R - Guide to Formwork for Concrete; American Concrete Institute International.
F. ASME A17.1 - Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers.
G. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).

1.4 DESIGN REQUIREMENTS
A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.5 SUBMITTALS
A. See Section 01300 - Administrative Requirements for submittal procedures.
B. Product Data: Provide data on void form materials and installation requirements.
C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
D. Provide data on form liner installation and provide min. 6" x 6" sample.

1.6 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 347R, ACI 301, and ACI 318. Maintain one copy of standards on project site.
B. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

1.7 REGULATORY REQUIREMENTS
A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.8 DELIVERY, STORAGE, AND PROTECTION
A. Section 01600 - Product Requirements: Transport, handle, store and protect products.
B. Deliver void forms and installation instructions in manufacturer's packaging.
C. Store void forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 – PRODUCTS

2.1 SECTION INCLUDES

A. Standard Structural Concrete Formwork is at the Contractor's discretion, but must meet minimum requirements specified below.

2.2 WOOD FORM MATERIALS

A. Typical Forms: Plyform, Class I, exterior minimum thickness 3/4" inch; in accordance with American Plywood Association Standards.
B. Keyways: 2 inch lumber.

2.3 PREFABRICATED FORMS

A. Manufacturers:
   1. American Polysteel Forms, Albuquerque, NM 87107
   2. Amico Stay-Form, Birmingham, IL 35208
   3. Molded Fiber Glass Concrete Forms Co., Union City, PA 16438.
   4. Sonoco Products Co., Hartsville, SC
   5. Symons Corp., Des Plaines, IL 60017
   6. Substitutions: See Section 01600 - Product requirements.
B. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
C. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
D. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
E. Pan Type: Steel, of size and profile indicated.

2.4 FORMWORK ACCESSORIES

A. Form Ties: Removable or Snap-off type, galvanized metal, adjustable length, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface; form ties designed to resist lateral pressure of fresh concrete on forms.
B. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.
C. Form Liners: Units of face designs, texture arrangement, and configuration indicated. Furnish with manufacturer's recommended liquid release agent that will not bond, stain or adversely affect concrete surfaces and will not impair subsequent surface treatments of concrete.
D. Rustication Strips: Metal, rigid plastic, or dressed wood with sides beveled and back kerfed; nonstaining.
E. Corners: Chamfered, wood strip or rigid plastic type; 3/4x 3/4 inch minimum size; maximum possible lengths.
F. Dovetail Anchor Slot: Galvanized steel, 22 gauge thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork. Provide _____ manufactured by _____.
G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
H. Waterstops: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, 4 inch wide, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Earth forms are not permitted.

3.3 ERECTION – FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301, ACI 347 and ACI 318.
B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
D. Align joints and make watertight. Keep form joints to a minimum.
E. Obtain approval before framing openings in structural members that are not indicated on drawings.
F. Provide chamfer strips on external corners of beams, joists, and columns.
G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
H. Coordinate this section with other sections of work that require attachment of components to formwork.
I. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION – FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work.
B. Locate and set in place items that will be cast directly into concrete.
C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04816.
E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
F. Install PVC waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.
G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.
B. Clean formed cavities of debris prior to placing concrete.
   1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
   2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117-90 and ACI 301. Where conflicts occur, the more stringent requirement shall apply.
B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.
C. Camber slabs and beams in accordance with ACI 301.

3.8 FIELD QUALITY CONTROL

A. An independent Testing Agency will perform field quality control tests, as specified in Section 01400.
B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
C. Do not reuse wood formwork more than 4 times for concrete surfaces to be exposed to view. Do not patch formwork.
D. When forms are reused, clean surfaces, remove laitance, and tighten to close joints. Align and secure joints to avoid offsets.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.
D. Wall Forms:
   1. If curing compound is not used, leave the forms in place for 7 days and keep continuously wet.
   2. If curing compound is used, remove forms 24 hours after concrete has been placed providing concrete has developed sufficient strength to sustain its own weight. Do not use curing compound on vertical concrete surfaces that will be painted or otherwise finished.
   3. During cold weather concreting, leave forms in place for 7 days in addition to placement of other cold weather protection.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Reinforcing steel for cast-in-place concrete.
B. Supports and accessories for steel reinforcement.

1.2 RELATED SECTIONS
A. Section 03100 - Concrete Forms and Accessories.
B. Section 03300 - Cast-In-Place Concrete.
C. Section 04810 - Unit Masonry Assemblies: Reinforcement for masonry.

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
C. ACI 318 - Building Code Requirements For Reinforced Concrete and Commentary; American Concrete Institute International.
D. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International.
E. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
F. ASTM A 184/A 184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
G. ASTM A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
H. ASTM A 497 - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
I. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
J. ASTM A 704/A 704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
K. ASTM A 767/A 767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
L. AWS D1.4 - Structural Welding Code - Reinforcing Steel; American Welding Society.
M. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute.
N. CRSI (P1) - Placing Reinforcing Bars; Concrete Reinforcing Steel Institute.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements for submittal procedures.
B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
   1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.
C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE
A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, and ACI 318.
   1. Maintain one copy of each document on project site.
B. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.
C. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the state where the project is located.

PART 2 – PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
   1. Deformed billet-steel bars.
   2. Galvanized in accordance with ASTM A 767/A 767M, Class I.
B. Reinforcing Steel Mat: ASTM A 704/A 704M, using ASTM A 615/A 615M, Grade 60 (420) steel bars or rods, unfinished.
C. Stirrup Steel: ASTM A 82 steel wire, unfinished.
D. Welded Steel Wire Reinforcing (W.W.R.): ASTM A 185, plain type. Provide in sizes as shown on Drawings and in flat sheets. Roll stock is not permitted.
E. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Bar Supports: Bolsters for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire precast concrete or fiber-reinforced concrete of greater compressive strength than concrete unless exceeded herein. Provide continuous length wire type bolsters with continuous sand plates for all slabs on grade. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.
   3. W.W.R. Supports: Chairs, for spacing, supporting, and fastening welded wire reinforcing in place. Provide continuous length wire type chairs with continuous sand plates for all welded wire reinforcing, placed in continuous rows maximum 4 feet on center or spaced sufficiently to support W.W.R. to intended position within concrete--plastic supports are not permitted for W.W.R. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.
   4. Bar and reinforcing Support Manufacturers:
      a. Dayton Richmond Concrete Accessories, Miamiburg, OH.
      b. Meadow Burke Products, Chicago, IL.
      c. Universal Form Clamp Co., Bellwood, IL.
      d. Substitutions: See Section 01600 - Product Requirements.
   5. Provide stainless steel, galvanized, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.
   6. Joint Dowel Bars: Plain-steel bars, ASTM A615/A615M, Grade 60 (420). Cut bars true to length with ends square and free of burrs.
F. Reinforcing for concrete topping of precast concrete hollow core plank
   1. Woven wire fabric: 2 inch x 2 inch X 14 gauge, plain type, in flat sheets.

2.2 DELIVERY, STORAGE, AND PROTECTION

A. Properly label all bars with weatherproof tags to facilitate identification.
B. Store reinforcing steel on supports above ground level. Keep covered with tarpaulins.
C. Protect coated bars from damage to coating.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
B. Welding of reinforcement is not permitted unless indicated on drawings. If and when explicitly indicated, perform welding in accordance with AWS D1.4.
C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Engineer.
   2. Minimize reinforcement splices.

PART 3 – EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement in accordance with CRSI. Do not deviate from required position.
B. Do not displace or damage vapor barrier for slabs on grade.
C. Accommodate placement of formed openings.
D. Lap welded wire fabric one full mesh at side and end laps and wire together.
E. Tie bars at all points where bars cross or as required by CRSI (P1).
F. Provide welded wire fabric in all interior concrete slabs on grade unless noted otherwise on plans.
G. Provide keys and dowels where the walls and other items are shown to be built integrally but are placed as separate pours. Use dowels of the same size and spacing as reinforcing but not less than 48 bar diameters embedment.
H. Splice reinforcing bars as required. Lap continuous reinforcing 48 diameters but not less than 18 inches.
I. Minimum Wall Reinforcing: Two No. 5 bars, continuous top and bottom, unless other sizes or quantities are indicated. Reinforcing bars shall be continuous around corners or corner bars shall be provided of the same size and spacing of reinforcing bars.
J. Prior to pouring concrete, check all reinforcing for contamination and clean as required.
K. Conform to applicable code and requirements of contract documents for concrete cover over reinforcement.
L. Tie bars at all points where crossed or as required by CRSI.
M. Provide welded wire fabric in all interior concrete slabs on grade unless noted otherwise on plans.

3.2 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01400, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Slabs on grade.
B. Joint devices associated with concrete work.
C. Concrete curing.

1.2 RELATED SECTIONS
A. Section 01400 - Quality Requirements: Testing and inspection services.
B. Section 02316 - Fill and Backfill.
C. Section 03100 - Concrete Forms and Accessories: Forms and accessories for formwork.
D. Section 03200 - Concrete Reinforcement.
E. Section 04810 - Unit Masonry Assemblies: Coordinate placement of vertical reinforcing.
F. Section 05120 - Structural Steel: Placement of anchor bolts.
G. Section 07900 - Joint Sealers.

1.3 REFERENCES
A. Unless otherwise noted, the most current issue of references shall be used.
B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.
C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute International.
D. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
E. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.
F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.
G. ACI 305R - Hot Weather Concreting; American Concrete Institute International.
H. ACI 306R - Cold Weather Concreting; American Concrete Institute International.
I. ACI 309R - Guide for Consolidation of concrete.
J. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International.
K. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
L. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete.
M. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
N. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
O. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
P. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
Q. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.
R. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
S. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
T. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
U. ASTM E 1643-98 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
V. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; Corps of Engineers.

1.4 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturers' data on manufactured products.
C. Samples: Submit two, 12 inch x12 inch samples of vapor barrier materials and all accessories.
D. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.
E. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.
F. Project Record Documents: Contractor shall coordinate with all trades to accurately record the actual locations of all embedded utility lines, conduits, piping and other items that will be concealed from view upon completion of concrete work.
G. Mix Design: Submit concrete mix design for each type and strength of concrete determined by either laboratory trial mix or field test data in accordance with ACI 211.1 and ACI 301. Submit mix design at least 15 days prior to first pour.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.
B. Acquire cement from same source and aggregate from same source for entire project.
C. Follow recommendations of ACI 305R when concreting during hot weather.
D. Follow recommendations of ACI 306R when concreting during cold weather.
E. Concrete design mix shall test 15% higher than specified requirements.
F. Test concrete in accordance with Section 01400 - Quality Requirements.
G. All items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.

PART 2 – PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 03100.

2.2 REINFORCEMENT

A. Comply with requirements of Section 03200.
B. Bolsters and Chairs for reinforcing support: Comply with requirements of Section 03200 specifically for slab on grade applications.
   1. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over the total life of structure.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I - Normal Portland type.
B. Fine and Coarse Aggregates: ASTM C 33.
C. Lightweight Aggregate: ASTM C 330.
D. Fly Ash: ASTM C 618, Class C or F.
E. Water: Clean and not detrimental to concrete.

2.4 ADMIXTURES

A. Air Entrainment Admixture: ASTM C 260.
B. Chemical Admixtures:
   1. ASTM C 494, Type A - Water Reducing.
   2. Other chemical admixtures may be used only when approved in writing by the Architect prior to use. Under certain conditions the Architect may consider the use of the following admixtures: ASTM C 494/C 494M, Type E - Water Reducing and Accelerating, Type F - Water Reducing, High Range, and Type G - Water Reducing, High Range and Retarding.
   3. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

2.5 VAPOR BARRIER

A. Acceptable products:
   1. Stego Wrap (15 mil) Vapor Barrier by Stego Industries (877) 464-7834 www.stegoindustries.com.
   2. Soco-Shield 15 mil. Vapor Barrier by Socopac (888) 276-2672 www.socoshield.com
   3. Moistop Ultra "A" 15 mil. Vapor Barrier by Fortifiber Building Products (800) 773-4777 www.fortifiber.com
   4. Premolded membrane with Plasmatic Core by W.R. Meadows 1-800-342-5976 www.wrmeadows.com
   5. Vaporguard by Reef Industries 1-800-231-6074 www.reefindustries.com
   6. Substitutions: NOT PERMITTED

B. Vapor Barrier Accessories: As recommended by the manufacturer for complete installation of vapor barrier placed over Granular Fill Material under Concrete Slabs as defined in Section 02316 - Fill and Backfill - and conforming to ASTM E 1643-98. Accessories include, but are not limited to:
   1. Seam Tape
   2. Pipe Boots
   3. Sealant or Mastic adhesive

2.6 CONCRETE ACCESSORIES

A. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.

B. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Bonding Agent: ASTM C 1059, Type II acrylic non-redispersable type.

D. Epoxy Bonding System: ASTM C 881, type as required by project conditions.

E. Non-Shrink Grout: ASTM C 1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
   2. Minimum Compressive Strength at 28 Days: 7,000 psi.

F. Moisture-Retaining Cover for slabs on grade: ASTM C 171; white burlap-polyethylene sheet.

G. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.

H. Anchors to be cast into concrete: As outlined in Section 05120 - Structural Steel.

2.7 JOINT DEVICES AND MATERIALS

A. Waterstops: As defined in Section 03100 - Concrete formwork: FORMWORK ACCESSORIES

B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, 1/2 inch thick and full depth of slab less 1/2 inch.

C. Construction Joint Devices: Integral extruded plastic; 0.0239 inch thick, formed to tongue and groove profile, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.

D. Sealant and Primer: As specified in Section 07900.

2.8 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.

C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience, as specified in ACI 301.

D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

E. Slabs on Grade:
   1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi.

2. Concrete weight: Normal (144 lbs. per cubic foot)
3. Cement Content: Minimum 470 lb. per cubic yard, maximum 517 lb per cubic yard.
4. Water-Cement Ratio: Maximum 44 percent by weight.
5. Total Air Content: Maximum 3 percent naturally occurring, per ASTM C 173.
   a. If air entrainment is added for workability, Water-Cement ratio shall be reduced to 40 percent by weight.
6. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
7. Maximum Slump: 3 inches plus or minus 1 inch.
8. Maximum Aggregate Size: 1-1/2 inch gradations shall include sizes up to 1 inch.
9. Water reducing agent required.

2.9 MIXING

A. Transit Mixers: Comply with ASTM C 94/C 94M.
B. Admixtures:
   1. Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer. All admixtures must be approved prior to placing concrete.
   2. Use accelerating admixtures in cold weather only when approved by Architect. Use of admixtures will not relax cold weather placement requirements.
   3. Use of calcium chloride is not permitted.
   4. Use set of retarding admixtures during hot weather only when approved by Architect.
   5. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.
B. Verify placement and compaction of granular fill for slab on grade applications prior to placement of vapor barrier. Compaction shall meet requirements of Section 02316 - Fill and Backfill as verified by the Testing Agency of Record.
C. Contractor shall coordinate with Division 15 and 16 trades and verify that all Mechanical, Electrical, Plumbing lines or other items placed are wholly within or below the CA-6 granular fill layer for slab on grade applications. Vapor Barrier may not be placed directly over any pipes, conduits or other items, but shall rest firmly on compacted granular fill.

3.2 PREPARATION

A. Formwork: Comply with requirements of Section 03200. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
B. Where sheet waterproofing will be applied, chamfer corners of concrete on a 45 degree angle measuring minimum 1/2 inch along the full face of the corner.
C. Verify that forms are clean and free of rust before applying release agent.
D. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.
E. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
F. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3 INSTALLATION OF VAPOR BARRIER

A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98 unless exceed herein.
   1. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.
   2. Lap Vapor Barrier over footings and seal to foundation walls.
   3. Overlap joints 6 inches and seal with sealant and seam tape.

4. Seal all barrier penetrations including pipes, electrical conduit, reinforcing penetrations or other items with pipe boot made from Vapor Barrier and seam tape.
5. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight. The use of brick type reinforcing supports for W.W.F. is prohibited.
6. Install compressible filler at slab perimeter and at all locations where slab meets vertical surface.

B. Remove all standing water from vapor barrier prior to placing concrete.
C. Notify Architect for review of vapor barrier installation a minimum of 48 hours prior to placing concrete. Contractor shall complete any remedial work required to comply with installations requirements as determined by the Architect.

3.4 INSTALLATION OF REINFORCING

A. Following placement of vapor barrier, install reinforcement in compliance with Section 03200 and ACI 301. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.

3.5 PLACING CONCRETE

A. Begin placing concrete within 60 minutes from the time truck leaves the concrete plant.
B. Place concrete in accordance with ACI 304R.
C. Do not add water to concrete during transport, delivery, at project site, or during placement unless approved by Architect.
D. Place concrete in a continuous operation and without segregation.
E. Placement of concrete requiring drops less than 10 feet may be by means of bottom discharge bucket, flexible drop chute, elephant-trunk, hopper or tremie, or free fall concrete may be used provided it is directed such that fall is vertical down the center of forms and reinforcing without hitting the sides, or reinforcement. Where a drop of more than 15 feet is required concrete must be pumped into place.
F. Consolidate concrete prior to the point in which the mechanical vibrator will not sink into the concrete by its own weight.
G. Consolidate concrete using a mechanical vibrator by inserting and withdrawing vertically at close uniform intervals, using a systematic pattern of vibration to ensure that all concrete has been adequately consolidated. When pouring multiple lifts, insert mechanical vibrator to a depth of penetrating the previous lift by minimum 6 inches. Use equipment and procedures as recommended by ACI 309R--Do not over consolidate. Do not allow vibrator to contact forms or reinforcing.
H. On surfaces where air void holes are objectionable, use additional vibration. Do not over vibrate.
I. Place concrete for floor slabs in accordance with ACI 302.1R unless exceeded herein.
J. Cold Weather Placement: Comply with ACI 306.1
K. Hot Weather Placement: Comply with ACI 305R.
L. Notify Architect not less than 48 hours prior to commencement of placement operations.
M. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
N. Separate slabs on grade from vertical surfaces with joint filler.
O. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
P. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07900 for finish joint sealer requirements.
Q. Install joint devices in accordance with manufacturer's instructions.
R. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

S. Slabs on grade shall be placed in continuous strips as per ACI recommendations. The maximum pour area shall not exceed 3600 square feet. Allow 24 hours to elapse between the placement of adjacent strips. Pour in alternating strip pattern so that no two adjoining slabs are poured the same day.
T. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
U. Place concrete continuously between predetermined expansion, control, and construction joints.
V. Do not interrupt successive placement; do not permit cold joints to occur. Provide construction joints at the termination of all pours.
W. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness. If no spacing of joints is indicated on drawings, place joints at a maximum spacing of 15 feet in each direction.
X. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
Y. Screed floors and slabs on grade level, maintaining surface flatness within maximum 1/8 inch from a level plane.

3.6 PLACING GROUT

A. Mix non-shrink grout in accordance with manufacturer's instructions
   1. Do not mix more grout than can be placed in 20 minutes.
   2. Do not retemper grout.
B. Soak concrete surfaces to receive grout and remove free water just before placing grout. Pack grout to form a full grout bed without air pockets or cavities. Trowel smooth and splay neatly to 45 degrees.

3.7 CONCRETE TOPPINGS FOR PRECAST HOLLOW CORE PLANKS

A. Grout all panel seams and other items as put forth in Section 03415.
B. Prior to placing floor topping, remove deleterious material. Broom and vacuum clean.
C. Place required dividers, edge strips, reinforcing, and other items to be cast in.
D. Place reinforcing in accordance with Section 03200.
E. Place concrete floor toppings to required lines and levels.
   1. Place topping in checkerboard panels not to exceed 30 ft in either direction.
F. Screed toppings level, as outlined in Placing Concrete above.

3.8 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.
B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
C. Where sheet waterproofing will be applied, contractor shall fill all voids in excess of 1/4 inch in diameter, remove all oil and form bond breaking material that may hinder adhesion of sheet waterproofing prior to installing waterproofing.
D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Wood float surfaces that will receive quarry tile and terrazzo with full bed setting system.
   2. Steel trowel all other surfaces.
E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:50 nominal.
F. Do not sprinkle dry cement on surfaces to absorb water.

3.9 CURING AND PROTECTION

A. Comply with requirements of ACI 308 unless exceeded herein. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
B. Apply evaporation retarder after floating to prevent premature surface setting under dry or windy conditions.
C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than 7 days.
   2. High early strength concrete: Not less than 4 days.
D. Formed Surfaces: Cure by moist curing with forms in place for full curing period of 7 days minimum. Where forms are removed prior to 7 day curing period, apply curing compound in two coats at right angles using application rate recommended by manufacturer.
E. Surfaces Not in Contact with Forms:
   1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by saturated burlap.
   2. Begin final curing after initial curing but before surface is dry.
      a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
F. Concrete slab curing:
   1. Wet cure all concrete slabs for a minimum of 7 days. Completely cover pour area with moisture retaining cover and protect against movement. Keep moisture retaining cover continuously moist for full 7 day period. Do not permit loading or partial loading caused by vehicle traffic or material placement during this curing period.
   2. In no case shall liquid curing compound be used where compound may be incompatible with floor finish materials. If the application of curing compound is questionable, the Contractor shall provide a review report by the finish materials manufacturer prior to the application of those materials to ensure that the proper moisture and other conditions exist and if any remedial work is required.

3.10 FIELD QUALITY CONTROL

A. An independent Testing Agency will perform field quality control tests, as specified in Section 01400.
B. Provide free access to concrete operations at project site and cooperate with appointed firm. Contractor must provide minimum 48 hours notice to testing agency and Architect prior to all concrete pours.
C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
E. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cu yd or less of each class of concrete placed.
F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents. Record ambient temperature at time of concrete sampling.
G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.
H. The testing agency will perform the following:
   1. Obtain representative samples of fresh concrete in accordance with ASTM C 172.
   2. Three concrete test cylinders will be taken for every 50 cu. yds. of each class of concrete placed, but not less than one set of test cylinders for any day's placement.
   3. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
   4. Perform compression strength tests. Break one cylinder at 7 days and two cylinders at 28 days.
   5. Perform one slump test for each 25 cubic yards of concrete or fraction thereof, but in no case less than two per each day of concrete pour, in accordance with ASTM C 143.

6. Test for air entrainment, one test for each 50 cubic yards of concrete or fraction thereof, in accordance with ASTM C 231.
7. If tests indicate concrete strengths below those required or visual defects indicate concrete of poor quality has been placed, additional tests shall be made and reported at the expense of the Contractor. Tests may be compression test on cored cylinders, ASTM C 42 and/or load tests as outlined in ACI 318.

3.11 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 72 hours of test.
B. Defective Concrete:
   1. Test samples not conforming to requirements or in-place concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
   2. Improper use or application of reinforcing accessories or other items that may compromise the integrity of the vapor barrier system.
   3. Improper placement of W.W.R. or other reinforcing.
C. Requirements for repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
D. Provide sample area of patch, fill, touch-up, repair, or exposed concrete for approval of the Architect for each type of area requiring repair.
E. Excessive honeycombing or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
F. Allow Architect to inspect concrete surfaces upon removal of forms and prior to backfilling or otherwise covering concrete.

END OF SECTION

SECTION 03505

SELF-LEVELING UNDERLAYMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Liquid applied cementitious self-leveling floor underlayment.

1.2 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS
A. See Section 01300 – Administrative Requirements, for submittal procedures.
B. Product Data: Provide physical characteristics, product limitations
C. Manufacturer's Instructions: Indicate mix instructions.

1.4 QUALITY ASSURANCE
A. Applicator Qualifications: Company specializing in performing the work of this section and approved by the manufacturer.

1.5 REGULATORY REQUIREMENTS
A. Conform to applicable code for combustibility or flame spread requirements.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Do not install underlayment until floor penetrations and peripheral work are complete.
B. Maintain ambient temperatures of 50 degrees for 24 hours before, during and 72 hours after installation of underlayment.
C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
A. Cementitious Underlayment:
   1. Ardex Engineered Cements. Inc.: www.ardex.com.
   2. Dayton Superior Corporation: www.daytonsuperior.com
   3. Dependable Chemical Co., Inc.: www.floorprep.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.2 ACCESSORIES
A. Provide all primers, cleaners, bonding agents or any other accessory materials recommended by the manufacturer for the intended installation.

2.3 MIXING
A. Site mix materials in accordance with manufacturer's instructions.
B. Mix to achieve following characteristics:
   1. Density: 100 lb/cu ft minimum dry density.
   2. Compressive strength: 1,000 psi minimum.
   3. Surface burning characteristics: Flame spread/smoke developed index of 0/0 in accordance with ASTM E 84.
C. Mix to self-leveling consistency.

PART 3 – EXECUTION

3.1 EXAMINATION
A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum bi-products or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION
A. Remove substrate surface irregularities. Fill voids and deck joints with latex based filler. Finish smooth.
B. Vacuum clean surfaces.
C. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

3.3 APPLICATION
A. Install underlayment in accordance with manufacturer's instructions.
B. Install underlayment as required, or as directed by the Architect, to correct any imperfections or irregularities which have caused the floor to be out of level.

3.4 CURING
A. Air cure in accordance with manufacturer's instructions.

3.5 APPLICATION TOLERANCE
A. Top Surface: Level to 1/8 inch in 5 feet.

3.6 PROTECTION OF FINISHED WORK
A. Do not permit traffic over unprotected floor underlayment surfaces.

3.7 SCHEDULES
A. Level all floor surfaces which will receive new flooring materials.

END OF SECTION

SECTION 04065

MORTAR AND MASONRY GROUT

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Mortar for masonry.
B. Grout for masonry.

1.2 RELATED SECTIONS
A. Section 01400 - Quality Requirements: Testing laboratory services.
B. Section 04810 - Unit Masonry Assemblies: Installation of mortar and grout.

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. ACI 530/ASCE 5/TMS 402 - Building Code Requirements For Masonry Structures; American Concrete Institute International;
C. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International.
D. ASTM C 5 - Standard Specification for Quicklime for Structural Purposes.
E. ASTM C 199 - Test Method for Pier Test for Refractory Masonry.
F. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
G. ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
H. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout.
I. ASTM E514 -90 - Standard Test Method for Water Penetration and Leakage Through Masonry
J. ASTM C 1384 - Standard Specification for Modifiers for Masonry Mortars.
K. ASTM C 1388 - Standard Test Method for Compressive Strength of Laboratory Constructed Masonry Prisms.
L. Contractor to verify that specified cleaning is done during progress of work and at the completion of each subcontractor's work.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C 270 is to be used. Also include required environmental conditions and admixture limitations.
C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
D. Contractor shall retain the services of an independent testing laboratory to test, evaluate and report on the following:
   1. Submit reports on mortar indicating compliance with component mortar materials to requirements of ASTM C 270 and test and evaluation reports per ASTM C 780.
   2. Reports: Submit reports on grout indicating compliance with component grout materials to requirements of ASTM C 476 and test and evaluation reports to requirements of ASTM C
E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
F. Manufacturer's Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.5 QUALITY ASSURANCE
A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
   1. Maintain one copy of each document on project site.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
B. Cold Weather Requirements: Comply with recommendations of ACI 530.1
C. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.
D. Hot Weather Requirements: Comply with recommendations of ACI 530.1

PART 2 – PRODUCTS

2.1 MATERIALS

A. Masonry Cement: ASTM C 91, Type S.
   1. Colored Mortar: Premixed cement as required to match Architect's sample.
B. Portland Cement: ASTM C 150, Type I – Normal, or Type II - Moderate; standard gray color.
C. Blended Cement: ASTM C 595, Type IP or i(PM) for type I or II cement.
D. Packaged Dry Mortar: ASTM C 387, using gray color cement.
E. Hydrated Lime: ASTM C 207, Type S or M.
F. Mortar Aggregate: ASTM C 144, standard masonry type.
G. Grout Aggregate: ASTM C 404.
H. Pigments for Colored Mortar: Iron or chromium oxides with demonstrated stability and colorfastness. Do not use carbon black.
   1. ASTM C 979: Pigment shall not exceed 10% of the weight of portland cement.
   2. Colors: As required to match Architect's color samples.
   3. Acceptable products:
      a. Soloman Colors: www.solomoncolors.com
      b. Davis Colors: www.concretestains.com
      c. Color Solutions, Inc.: www.dynamiccolorsolutions.com
      d. Prism Pigments: www.prismpigments.com
      e. Western Lime and Cement Co.
   4. Substitutions: See Section 01600 - Product Requirements.
I. Water: Clean and potable.
J. Accelerating Admixture: Not Permitted.
K. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity; Integral liquid polymeric admixture for mortar added during mixing, capable of achieving a Class E Rating when evaluated using ASTM E 514 with the test extended to 72 hours, using the rating criteria specified in ASTM E 514.
L. Bonding Agent: Latex type.

2.2 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C 270, Property Specification.
   1. Engineered Masonry: Type S.
   2. Masonry below grade and in contact with earth: Type S.
   3. Exterior, loadbearing masonry: Type M or S.
   4. Exterior, non-loadbearing masonry: Type M or S.
   5. Interior, loadbearing masonry: Type M or S.
   6. Interior, non-loadbearing masonry: Type N.
   7. Glass unit masonry: Type N or S.
   8. Pointing mortar: Prehydrated Type N with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
B. Stain Resistant Pointing Mortar: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 percent of Portland cement by weight.
C. Pointing Mortar For Glass Unit Masonry: ASTM C 270, Prehydrated Type M, using the Property Specification.

1. Maximum 2 percent ammonium stearate or calcium stearate per cement weight.
2. Beach sand aggregate.

D. Mortar for Stone: ASTM C 270, Property Specification.
   1. Setting mortar:
      a. Granite: Type S mortar.
      b. Limestone: Type N mortar.
      c. Marble: Type S mortar.
      d. Travertine: Type S mortar.
      e. Quartz-based stone: Type N mortar.
      f. Slate: Type S mortar.
   2. Pointing mortar:
      a. Granite: Type S mortar.
      b. Limestone: Type N mortar.
      c. Marble: Type N mortar.
      d. Travertine: Type N mortar.
      e. Quartz-based stone: Type N mortar.
      f. Slate: Type N mortar.

E. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.3 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.
B. Maintain sand uniformly damp immediately before the mixing process.
C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
D. Do not use anti-freeze compounds to lower the freezing point of mortar. Do not use set accelerators unless approved in writing by The Brick Institute of America (BIA), National Concrete Masonry Association (NCMA), ASTM C 270, the Architect of Record and the Engineer of Record. The use of admixtures does not relax cold weather protection requirements.
E. If water is lost by evaporation, re-temper only within two hours of mixing.
F. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.4 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide grout in accordance with ASTM C 476. Use or fine grout in accordance with ACI 530 and 530.1.
B. Engineered Masonry: Unless otherwise noted provide grout with 3,000 psi strength at 28 days; 7-8 inches slump; mix in accordance with ASTM C 476.
   1. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.5 GROUT MIXING

A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C 476
B. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
C. Do not use anti-freeze compounds to lower the freezing point of grout. Do not use set accelerators unless approved in writing by The Brick Institute of America (BIA), National Concrete Masonry Association (NCMA), ASTM C 270, the Architect of Record and the Engineer of Record. The use of admixtures does not relax cold weather protection requirements.

2.6 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01400.

B. Mortar Mixes: Test mortars pre-batched by weight in accordance with ASTM C 270 or ASTM C 780 recommendations for preconstruction testing for compressive strength, consistency, mortar aggregate ratio, water content, air content and splitting tensile strength.
   1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.
C. Grout Mixes: Test grout batches in accordance with ASTM C 1019 procedures for compressive strength and slump.
   1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

PART 3 – EXECUTION

3.1 PREPARATION

A. Apply bonding agent to existing smooth finish concrete surfaces.
   1. Plug clean-out holes for masonry with brick or masonry units to match adjacent surfaces. Brace masonry for wet grout pressure.
B. Request inspection of spaces to be grouted.

3.2 INSTALLATION

A. Install mortar and grout to requirements of Section 04810; and in accordance with ACI 530.1/ASCE 6.
B. Work grout into masonry cores and cavities to eliminate voids.
C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
D. Do not displace reinforcement while placing grout.
E. Remove excess mortar from grout spaces.

3.3 GROUTING

A. Use either high-lift or low-lift grouting techniques, at Contractor's option, in accordance with ACI 530.1.
B. Consolidate grout with a mechanical vibrator on any grout pours greater than 12 inches in height; and in accordance with ACI 530.1. Grout pours 12 inches or less in height shall be mechanically vibrated or puddled. Do not over consolidate.
C. When grouting is stopped for 1 hour or longer, stop the grout pour 1 1/2 inches below the top of the masonry to create a shear key.
D. Pour grout only after reinforcing is in place. Prevent displacement of bars as grout is poured.
E. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
F. Place grout for spanning elements in single, continuous pour.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field tests, in accordance with provisions of Section 01400.
   1. Tests and evaluation listed in this Article will be performed during construction for each 5000 square feet of wall area or fraction thereof.
B. Test and evaluate mortar in accordance with ASTM C 780 procedures.
   1. Test with same frequency as specified for masonry units.
C. Test and evaluate grout in accordance with ASTM C 1019 procedures.
   1. Test with same frequency as specified for masonry units.
D. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C 1388, and for flexural bond strength in accordance with ASTM C 1072 or ASTM E 518; perform tests and evaluate results as specified in individual masonry sections
   1. Prepare set of prisms for testing at 7 days and 1 set for testing at 28 day

END OF SECTION

SECTION 04810

UNIT MASONRY ASSEMBLIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Concrete Masonry Units.
B. Reinforcement and Anchorage.
C. Flashings.
D. Accessories.

1.2 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement: Reinforcing steel for grouted masonry.
B. Section 04065 - Mortar and Masonry Grout.
C. Section 05120 - Structural Steel: accessories for masonry construction.
D. Section 06100 - Rough Carpentry: Nailing strips built into masonry.
E. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.3 REFERENCES

A. Unless otherwise noted the most current issue of the reference shall be used.
B. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International.
C. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International.
D. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials—Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)
F. ASTM - D2240 - Standard Test Method for Rubber Property-Durometer Hardness
G. ASTM D 2287 - Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
H. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
I. ASTM A 641/A 641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
J. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
K. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
L. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
M. ASTM C 27 - Standard Classification of Fireclay and High-Alumina Refractory Brick.
N. ASTM C 34 - Standard Specification for Structural Clay Load Bearing-Wall Tile.
O. ASTM C 55 - Standard Specification for Concrete Brick; 2001a.
P. ASTM C 56 - Standard Specification for Structural Clay Non-Load-Bearing Tile.
Q. ASTM C 62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
R. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
S. ASTM C 91 - Standard Specification for Masonry Cement.
T. ASTM C 126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
U. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
V. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
W. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
X. ASTM C 150 - Standard Specification for Portland Cement.
Y. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
Z. ASTM C 212 - Standard Specification for Structural Clay Facing Tile.
AA. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
BB. ASTM C 315 - Standard Specification for Clay Flue Linings.

CC. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout.
DD. ASTM C 476 - Standard Specification for Grout for Masonry.
EE. ASTM C 530 - Standard Specification for Structural Clay Nonloadbearing Screen Tile.
FF. ASTM C 652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
GG. ASTM C 744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
HH. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
II. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
JJ. ASTM E 514-90 - Standard Test Method for Water Penetration and Leakage Through Masonry

1.4 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and all flashings including accessories and primer.
C. Samples; submit three of each for review:
1. Inside, outside corners self-adhering rubberized flashing end dams and outside corners.
2. 2 inch x 6 inches wide x .015 inch thick stainless steel drip with hemmed edge.
3. 2 inch x 1-5/8 inch wide x .015 inch thick stainless steel drip with hemmed edge.
4. Sealant.
5. 12 inch long section of Termination bar.
6. Joint filler: full width x 6 inches long.
7. Preformed Control Joints: 6 inches long.
8. Weep/Cavity Vents: Manufacturer's full color range.
9. Anchors: submit each type of anchor required.
D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
1. Maintain one copy of each document on project site.

1.6 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 6 feet long by 4 feet high, which includes an exterior wall corner, flashing end dams and lap joints, window sill condition, cavity insulation with adhesive, mortar and accessories, all typical accessories, control joints with sealant, and structural backup.
B. Locate where directed.
C. Rebuild mock-up or non-conforming work within mock-up to meet intent of all specified components at the direction of the Architect.
D. Mock up will be used as the standard of quality for all masonry installation on the project.
E. All work shall conform to the specifications and quality established in the mock-up panel.
F. Mock-up may not remain as part of the finished work.

1.7 PRE-INSTALLATION MEETING

A. Convene minimum one week before starting work of this section.
B. Construct Mock-up wall prior to pre-installation meeting.
C. Attendance:
1. Contractor
2. Mason contractor.
3. Mason foreman.
4. Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
B. Handle and store ceramic glazed masonry units and pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.
C. Stack masonry units, anchors, ties and miscellaneous accessories on wood pallets or blocking above ground and protect from exposure to weather at all times.
D. Cover brick, all masonry units and all reinforcing and accessories with covers that permit air circulation and prevent moisture infiltration.
E. Any materials not protected at all times will be marked rejected and shall be removed from the site by the contractor within 24 hours. All transportation and replacement costs and delays in the schedule will be the sole responsibility of the contractor and at no additional cost to the owner.
F. Clean all materials of dirt, mud, ice, rust, or other foreign substances immediately prior to using.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: Comply with ACI 530.1.
B. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
C. Do not build on frozen work.
D. Remove and replace all masonry work damaged by freezing.
E. Hot Weather Requirements: Comply with ACI 530.1.
F. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

1.10 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.
B. Provide 50 of each size, color, and type of glazed units for Owner's use in maintenance of project.

PART 2 – PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Acceptable Manufacturers:
   1. Best Block Co.; www.bestblock.net.
   2. Chicago Block and Brick; www.chicagoblock.com
   3. Northfield Block; www.northfieldblock.com
   4. Trenwyth Industries; www.trenwyth.com
   5. Valley Block & Supply Co., Inc., Elgin, IL 60123.
B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide bullnose units for outside corners unless otherwise indicated.
C. Load Bearing Concrete Masonry units: Comply with referenced standards and as follows:
   1. Size: Unless otherwise noted provide standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   2. Load-Bearing Units: ASTM C 90, medium weight.
      a. Hollow block with nominal 1 3/8 inches shell thickness unless indicated otherwise on contract drawings.
      b. Exposed faces: Manufacturer's standard color and texture where indicated.

D. Non-Load Bearing Units: Comply with referenced standards and as follows:
   1. Hollow block, as indicated unless otherwise noted.
   2. Size: Unless otherwise noted provide standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   3. Load-Bearing Units: ASTM C 129, medium weight.
      a. Hollow block with nominal 1 3/8 inches shell thickness unless indicated otherwise on contract drawings.
      b. Exposed faces: Manufacturer's standard color and texture where indicated.

2.2 MORTAR AND GROUT MATERIALS

A. Mortar and grout: As specified in Section 04065.

2.3 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Heckmann Building Products, Inc: www.heckmannbuildingprods.com.
   3. Hohmann & Barnard, Inc: www.h-b.com.
   4. Masonry Reinforcing Corporation of America: www.wirebond.com.
   5. Substitutions: See Section 01600 - Product Requirements.

B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 deformed billet bars.

C. Vertical Structural Reinforcing Steel: type as specified in Section 03200; size as indicated on drawings; uncoated finish.

D. Interior Single Wythe Joint Reinforcement: Contractor option of Truss or ladder type; ASTM A 82 steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

E. Exterior Single Wythe Joint Reinforcement: Ladder type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

F. Interior Multiple Wythe Joint Reinforcement: 3 Wire Ladder or truss type; spaced 16 inches on center vertically ASTM A 82 steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods minimum with 0.1483 inch cross rods and pintles; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

G. Exterior Multiple Wythe Joint Reinforcement: 3 Wire Ladder type; spaced 16 inches on center vertically ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods minimum with 0.1483 inch cross rods and pintles; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

H. Exterior Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties or tabs spaced at 16 in on center ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire in compliance with ACI 530; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
   1. Vertical adjustment: Not more than 2 inches.
   2. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.

I. Exterior Cavity Wall Multiple Wythe reinforcement: Contractor choice of Exterior Multiple Wythe joint reinforcing or Exterior Adjustable Multiple Wythe Joint Reinforcing placed at 16 inches on center and in compliance with ACI 530.1. Where a two piece (eye and pintle) adjustable system is used in the backup wythe, an additional ladder reinforcement is to be added to the face wythe one course above or below the 2 piece system and at 16 inches on center vertically and conforming to the characteristics of single wythe reinforcing.

J. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
   1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.06 in thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
   2. Steel frame: Crimped wire anchors for welding to frame, minimum 0.25 inch thick, with triangular wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

K. Wall Ties: Corrugated formed sheet metal, minimum 7/8 inches x 7 inches x 0.065 inches thick, adjustable hot dip galvanized to ASTM A 153/A 153M, Class B.

L. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Triangular shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 3-1/2 inches.

M. Additional Anchors for Masonry to Structural Steel.
   1. Vertical wide flange column - Flanges parallel to wall:
      a. STRAP-TYPE COLUMN & WALL ANCHOR with CORRUGATED COLUMN ANCHOR WALL TIE: 1/8 inch x 7 inches long x 2 inches wide x 1-1/2 inch fold back with a 5/8 inch wide x 1 inch deep slot starting 1 inch from end. Wall tie 22 gage x 1 inch (25.4 mm) wide x 24 inches (610 mm) long. All components hot dip galvanized to ASTM A 153/A 153M, Class B-2.
   2. Vertical wide flange column - Flanges perpendicular to wall:
      a. TWISTED L-TYPE COLUMN & WALL ANCHOR (left and right) and 190-WT CORRUGATED COLUMN ANCHOR WALL TIE 1/8 inch x 1-1/4 inch wide x length with a 1-1/2 inch fold back with a twist to start length from inside of hook. Wall tie 22 gage x 1 inch wide x 24 inches long. All components shall be hot dip galvanized to ASTM A 153/A 153M, Class B-2.

2.4 ACCESSORIES

A. Preformed Control Joints: Polyvinyl chloride material meeting ASTM D 2287 with a durometer hardness minimum of 80 when tested in conformance with ASTM D-2240. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Illinois Products Corp.; www.illinoisproducts.com.
      b. Dur-O-Wal Inc.; www.dur-o-wal.com.
      c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
      d. Hohmann & Barnard, Inc; www.h-b.com.
      e. Substitutions: See Section 01600 - Product Requirements.

B. Frame installation contractor to provide bitumastic coating for all exterior door frames for the entire length of the frame prior to frame installation.

C. Joint Filler: Closed cell polyvinyl chloride; meeting ASTM D 1667 Type VE-41; oversized 50 percent to joint width; self expanding; 3 and 6 inch wide x maximum lengths available.
   1. Manufacturers:
      a. Illinois Products Corp.; www.illinoisproducts.com.
      b. Dur-O-Wal Inc.; www.dur-o-wal.com.
      c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
      d. Hohmann & Barnard, Inc; www.h-b.com.
      e. Substitutions: See Section 01600 - Product Requirements.

D. Cavity Drip/Insulation Retaining Ring: Molded PVC grilles, insect resistant. PVC clip-type retainer for rigid board insulation; attaches to loop wires on horizontal joint reinforcement
   1. Manufacturers:
      a. Illinois Products Corp.; www.illinoisproducts.com.

b. Dur-O-Wal Inc.; www.dur-o-wal.com.
c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
d. Hohmann & Barnard, Inc; www.h-b.com.
e. Substitutions: See Section 01600 - Product Requirements.

E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

F. Beam and Column Isolation Wrap: Contractor choice of closed cell Expanded Polyethylene, closed cell Neoprene or closed cell PVC. Minimum of ½ inch thick, continuous wrap provided in largest sheets available.
1. Expanded Polyethylene:
a. Structure: Closed cell
b. Density: 1.5
c. Compression Deflection (Force to compress 75% of original) (PSI at 25%): 6
d. Water Absorption (% by Volume): 0.5
e. Applicable Standard: ASTM D 1056 / D 624 / C 272
2. Neoprene:
a. Structure: Closed cell
b. Density: 8 to 12
c. Compression Deflection (Force to compress 75% of original) (PSI at 25%):2-5
d. Applicable Standard: ASTM D 1056
3. PVC:
a. Structure: Closed cell
b. Density: 3 to 5
c. Compression Deflection (Force to compress 75% of original) (PSI at 25%): 12.5
d. Applicable Standard: ASTM D 1667

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.
B. Verify that related items provided under other sections are properly sized and located.
C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Wetting of Brick: Wet brick prior to laying if the initial rate of absorption exceeds 30 g/30 sq. in. (g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb the water so they are damp but not wet at the time of laying.
B. Determine any adjustments in mortar mix to accommodate brick absorption and weather conditions necessary to produce appropriate bond to brick and to insure water-resistive wall construction.
C. Install and coordinate placement of metal anchors supplied for securing materials of other sections type, size, finish and spacing as indicated in the drawings and as required by ACI 530.
D. Determine requirements for temporary bracing of walls which require bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
E. Consult and coordinate masonry work with other crafts to avoid future cutting and patching.
F. Provide column isolation wrap at all intersections of steel and masonry unless otherwise noted.

3.3 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.
B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave at all locations unless otherwise noted.

3.4 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
B. Provide cleanouts minimum 8 inches long and 1 brick high, 24 inches on center in the course immediately above any flashing.
C. Lay hollow masonry units with full face shell bedding on head and bed joints.
D. Lay first course of all masonry above steel and concrete surfaces in full bed of mortar.
E. Lay all concrete masonry units dry.
F. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
G. Remove excess mortar as work progresses.
H. Interlock intersections and external corners, except for units laid in stack bond.
I. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
J. Do not use broken, chipped or cracked units where exposed to view.
K. Where necessary to stop off a horizontal run of masonry, rack back one-half block length or one half brick length in each course. Toothing is not permitted,
L. Where fresh masonry joints partially or totally set masonry, clean exposed surface of set material and remove loose mortar and foreign material prior to laying fresh masonry.
M. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
N. Fill mortar joints flush where wall tile or resilient base is scheduled. All other joints shall be tooled as scheduled above in coursing.
O. Isolate interior masonry partitions from vertical structural framing members and exterior walls with open one-half inch joint with joint filler. Maintain continuous joint reinforcement through installation.
P. Isolate masonry partitions from vertical structural framing members with a control joint.
Q. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible filler.
R. Extend and anchor all masonry walls to underside of floors, beams or roof structure, unless otherwise indicated.
S. Brick up solid wherever beams bear on masonry, except where otherwise indicated.
T. Provide soft joints at all dissimilar materials. Rake back mortar at dissimilar materials to provide sufficient width to depth ratio for soft joint. Provide backer rod or bond breaker tape and sealant as specified in Section 07900 - Joint Sealers

3.5 CLEANOUTS

A. Provide cleanouts in exterior masonry wythes in every course immediately above through wall flashings.
   1. Cleanouts are to occur every third brick horizontally for exterior brick wythes.
   2. Cleanouts are to occur every second block horizontally for exterior CMU wythes.

3.6 REINFORCEMENT AND ANCHORAGE – GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
C. Place continuous joint reinforcement in first and second joint below top of walls.
D. Lap joint reinforcement ends minimum 6 inches.
E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

F. For exterior multiple wythe systems, reinforce stack bonded brick and concrete masonry units of any configuration with an additional layer of horizontal reinforcing within the outer wythe. Install at 16 inches on center vertically and alternate with cross wythe reinforcing.
G. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.7 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement 16 inches on center.
B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
C. Place continuous joint reinforcement in first and second joint below top of walls.
D. Lap joint reinforcement ends minimum 6 inches.
E. Do not continue horizontal joint reinforcement through control and expansion joints.
F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
G. Secure wall to decking above as shown on drawings to guard against lateral movement.

3.8 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches on center.
B. Place masonry joint reinforcement in first and second horizontal joints above openings and the second horizontal joint below openings unless otherwise indicated on drawings. Extend minimum 16 inches each side of openings.
C. Place continuous joint reinforcement in first and second joint below top of walls.
D. All masonry wythes are to have continuous horizontal joint reinforcing at 16 inches on center vertically. Where a two piece (eye and pintle) system is used in the backup wythe an additional ladder reinforcement is to be added to the face wythe one course above or below the 2 piece system 16 inches on center vertically.
E. For exterior multiple wythe systems, reinforce stack bonded brick and concrete masonry units of any configuration with an additional layer of horizontal reinforcing within the outer wythe. Install at 16 inches on center vertically and alternate with cross wythe reinforcing.
F. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by the manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other similar special conditions where continuity of reinforcement is interrupted.
G. Lap joint reinforcement ends minimum 6 inches.
H. Do not continue horizontal joint reinforcement through control and expansion joints.
I. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 24 inches vertically.
J. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
K. Provide adjustable wall ties for exterior masonry over steel stud framing, corrugated wall ties are not permitted.
L. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 24 inches horizontally and 24 inches vertically.
M. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 16 on center.
N. Stud back-Up: Secure adjustable veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 16 on center.
O. Reinforce concrete masonry units of walls and partitions with deformed steel bars as indicated on the drawings.

P. Support and secure reinforcing bars from displacement. Maintain position within tolerances specified by ACI 530.1.
Q. Lap reinforcing bars splices minimum 48 bar diameters.

3.9 REINFORCEMENT AND ANCHORAGES – MULTIPLE WYTHE UNIT MASONRY

A. Install horizontal joint reinforcement 16 inches on center.
B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
C. Place continuous joint reinforcement in first and second joint below top of walls.
D. Lap joint reinforcement ends minimum 6 inches.
E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 24 inches vertically.
F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.10 LINTELS

A. Install loose steel lintels over openings.
   1. Connect lintel to bearing plate where indicated.
   2. Build masonry tight to all encased surfaces of lintels.
B. Install reinforced unit masonry lintels over openings where steel or pre-cast concrete lintels are not scheduled.
   1. Openings to 42 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
   2. Do not splice reinforcing bars.
   3. Allow masonry lintels to attain specified strength before removing temporary supports.
C. Maintain minimum 8 inch bearing on each side of opening.

3.11 GROUTED COMPONENTS

A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web, unless indicated otherwise.
B. Lap splices minimum 48 bar diameters. No lap splices are permitted in bond beams over masonry openings.
C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
D. Place and consolidate grout fill without displacing reinforcing.
E. At bearing locations, fill masonry cores with grout for a minimum 2 courses below and 24 inches horizontally for lintels and 3 courses below and 24 inches horizontally for beams unless noted otherwise on drawings.

3.12 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.
B. Form all Control Joints with Jamb blocks.
C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
D. Control joints shall align with wall discontinuities such as window and door jambs.
E. Size control joint in accordance with Section 07900 for sealant performance.
F. Control and Expansion joints are to be spaced no more than 20 feet apart; and must be within 2 feet of one side of exterior building corners; AS INDICATED ON DRAWINGS. In the absence of indications on drawings, the Contractor shall contact the Architect in writing for direction as to where to place the joints prior to proceeding with the work of this section. Any masonry engaged by the contractor without such notification shall be repaired by the Contractor at no cost to the Owner and as directed by the Architect.

3.13 BUILT-IN WORK

A. As work progresses, install built-in metal door frames, glazed frames, window frames, and anchor bolts and other items to be built into the work and furnished under other sections. Frame installing contractor shall coat inside of frames to be installed in masonry or to be grouted, with bituminous coating prior to installation as noted. Apply wet to 18.0 mils (450 microns) in one or two coats. Total dry film thickness of not less than 12 mils (300 microns) or in excess of 30 mils.
B. Install built-in items plumb, level, and true to line.
C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame jamb voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
D. Grout all spaces around built-in items solid
E. Do not build into masonry construction organic materials that are subject to deterioration.

3.14 TOLERANCES

A. Construct unit masonry assemblies in strict accordance with ACI 530.1, but not less than tolerances below.
B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01400.

3.17 CLEANING

A. Remove excess mortar and mortar smears as work progresses.
B. Replace defective or discolored mortar. Match adjacent work.
C. Clean soiled surfaces with cleaning solution.
D. Replace chipped or broken units where exposed to view.
E. Use non-metallic tools in cleaning operations.

3.18 PROTECTION OF FINISHED WORK

A. Without damaging completed work, provide protective boards at exposed external corners, which are subject to damage by construction activities and maintain until substantial completion of masonry.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Structural steel framing members, and accessories.

1.2 RELATED SECTIONS
A. Section 04810 - Steel Unit Masonry Assemblies: Supply of anchors for embedding into masonry

1.3 REFERENCES
A. Unless noted otherwise, the most current issue of reference shall be used.
B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.
C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
D. AISC S329 - RCSC's Allowable Stress Design Specification for Structural Joints Using ASTM A325 or A490 Bolts; American Institute of Steel Construction, Inc.
E. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
F. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
G. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
H. ASTM A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength.
I. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
J. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
K. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts.
L. ASTM A 992/A 992M - Standard Specification for Structural Steel Shapes.
M. ASTM A992/A992M Standard Specification for Steel for Structural Shapes for Use in Building Framing.
N. ASTM E 94 - Standard Guide for Radiographic Examination.
O. ASTM E 142 - Standard Method for Controlling Quality of Radiographic Testing.
P. ASTM E 164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
Q. ASTM E 709 - Standard Guide for Magnetic Particle Examination.
R. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.
S. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.
T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Shop Drawings for review:
   1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.
   2. Connections.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
C. Erection Procedure: Submit descriptive data to illustrate the structural steel erection procedure, including the sequence of erection and temporary staging and bracing for information.
D. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements for information.
E. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis for information.

F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months for information.
G. Fabricate structural steel in accordance with Section 6 of AISC S303 and Chapter M of AISC M016.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel in accordance with Section 6 of AISC S303 and Chapter M of AISC M016.
B. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.
D. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.
E. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located. Provide signed and sealed connection design calculations if requested by Architect/Structural Engineer of Record (SER).

1.6 REGULATORY REQUIREMENTS

A. Comply with Illinois Steel Procurement Act, As Amended (Illinois Revised Statutes, Ch. 48, Par. 1801 ET SEQ.).

1.7 DELIVERY, STORAGE AND PROTECTION

A. Store structural steel members at project site above ground on platforms, skids or other supports.
B. Store other materials in a watertight and dry place, until ready for use in the work.
C. Store packaged materials in their original unbroken package or container.
D. Do not allow dirt, mud or other foreign materials to collect on structural steel. Steel materials shall be clean from all debris and ready to receive finishes prior to erection.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Steel Bars Angles, Plates, Channels, and Rod: ASTM A 36/A 36M.
B. Rolled Steel Structural Shapes: ASTM A 992/A 992M.
C. Cold-Formed Structural Tubing: ASTM A 500, Grade B.
D. Hot-Formed Structural Tubing: ASTM A 501, seamless.
E. Pipe: ASTM A 53/A 53M, Grade B, Finish black unless otherwise noted.
F. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, medium carbon, plain.
G. High-Strength Structural Bolts: ASTM A 490 (ASTM A 490M), with matching ASTM A 563 (ASTM A 563M) nuts and ASTM F 436 washers; Type 1 alloy steel.
H. Anchor Bolts: ASTM A 307, Grade C.
I. Shop and Touch-Up Primer: complying with VOC limitations of authorities having jurisdiction. Lead and Chromate-free, non-asphaltic, rust inhibiting primer.
J. Welding Materials: AWS D1.1; type required for materials being welded.
K. Sliding Bearing Plates: Lower Element - PTFE Sliding Surface Bonded to Carbon Steel Plate. Upper Element - 316 Stainless Steel Plate with ZB Finish on Sliding Surface Face.
L. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107 and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
M. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Shop fabricate to greatest extent possible.
B. Dimensional tolerances shall be as permitted in the AISC S303.
C. Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded.
D. Fabricate connections for bolt, nut, and washer connectors.
E. Develop required camber for members. . Fabricator shall maintain record of beams cambered and actual measured camber provided in fabricated members.
F. Bearing Plates: Provide bearing plates under lintels, beams and joists resting on walls. Provide bearing plates loose. Where size is not indicated on plans provide plate 1/2 x 8" x width of wall minus 1".
G. Opening Framing: Provide frames at all floor and roof openings equal to or larger than 12".
H. All steel embedded in or adjacent to masonry construction shall have adjustable masonry anchors spaced not greater that 16" vertically and 24" horizontally, unless otherwise noted, whether or not such ties are explicitly indicated on the drawings.
I. Typical beam connections shall be standard AISC framed beam connections, unless otherwise shown. All field connections, except where shown welded, shall be bolted with ¾" diameter, high strength bolts, unless otherwise noted. Where reactions are not indicated, connections shall be designed for 60% of the total allowable uniform load (in kips) derived from AISC Manual table of "Allowable Loads on Beams" for non-composite beams.
J. All coped beams to be designed in accordance with Section J4 of AISC's "Specification For Structural Steel Buildings"-ASD. Provide reinforcing as required. All re-entrant corners to be shaped, notch-free, to a radius of at least ½ inch.
K. All beam splices, not indicated on the contract documents, shall be full penetration welded to restore full capacities of the original beam; bolted connections shall be used for erection purposes only, unless approved in writing by Structural Engineer of Record. If splices are required for construction purposes, contractor shall coordinate all splice locations with General Contractor or Construction Manager to avoid any interference/conflicts with other trades.
L. Unless otherwise noted, the structural steel supplier shall furnish L5 x 3 1/2 x 5/16 shop welded angle frames at all roof and floor openings. Contractor shall verify in field all sizes and locations.

2.3 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP-2, Hand Tool Cleaning or better.
B. Shop prime structural steel members unless otherwise noted. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
C. Galvanize any structural steel members indicated to be galvanized to comply with ASTM A123/A 123M. Provide minimum 1.3 oz/sq. ft. galvanized coating.

2.4 SOURCE QUALITY CONTROL AND TESTS

A. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with AISC S329 testing at least 20 percent of bolts at each slip critical or Direct Tension connection. Bolts in Non-Slip Critical Connections Need Not Be Tested.
B. Radiographic testing performed in accordance with ASTM E 94 and ASTM E142.
    1. Radiographic testing performed in accordance with ASTM E 94 and ASTM E 142.
    2. Ultrasonic testing performed in accordance with ASTM E 164.
    3. Liquid penetrant inspection performed in accordance with ASTM E 165.
    4. Magnetic particle inspection performed in accordance with ASTM E 709.
C. In Addition to Visual Inspection, Shop Welded Shear Connectors Shall Be Inspected and Tested In Accordance With AWS D1.1 For Stud Welding and the Following:
    1. Bend Test will be performed when visual inspections reveal either less than a continuous 360-degree flash or welding repairs.
    2. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel including elevations of bearing surfaces and locations of anchorages and that the work may properly proceed.
B. Verify that materials are clean, free of all debris and prepared for erection. Clean all dirt, mud or other foreign materials from structural steel and related items. Steel materials shall be clean from all debris and ready to receive finishes prior to erection.

3.2 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
B. Tighten anchor bolts after supported members have been positioned and plumbed.
C. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
D. Field weld components and shear studs indicated on shop drawings.
E. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
F. Do not field cut or alter structural members without approval of Architect.
G. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
H. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.
I. Install shop welded angle frames at all roof and floor openings in preparation for decking.

3.3 ERECTION TOLERANCES

A. Erect structural steel within tolerances of AISC S303, Section 7, except as noted.
B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
C. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC S329 testing at least 20 percent of bolts at each slip critical and direct tension connection. Bolts in non-slip critical or direct tension connections need not be tested, but visually checked for number of bolts and snugness.
C. Shear Connectors: In addition to visual inspection, field welded shear connectors shall be inspected and tested in accordance with AWS D1.1 for stud welding and the following:
D. Bend Test will be performed when visual inspections reveal either less than a continuous 360-degree flash or welding repairs.
E. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1.
F. The structural steel framing members shown on the contract drawings rely on other non-structural steel building components for final lateral strength and stability (previously referred to as a non-self-supporting frame by the AISC). The following portions of the AISC S303 "Code of Standard Practice for Steel Buildings and Bridges" , Section 7.10.1, shall be modified as follows:
    1. add the words "endeavor to" after the word shall.
    2. in paragraph (b), substitute the word "extraordinary" for the word "special".

3. add paragraph (c) "However, the Owner's Designated Representative for Design shall not be responsible for lateral strength and stability support or bracing which is dependent upon the Contractors means and methods of construction".

G. The Contractor shall employ the services of a licensed structural Engineer if the Contractor is unable to assume complete responsibility for any and all temporary support and bracing as required by the Contractor's sequence, schedule and procedures of construction. Commencement of erection shall indicate that the contractor understands all temporary support and bracing requirements and assumes responsibility for maintaining the overall stability of the entire structure and of each individual component throughout construction and until such time that all structural work is complete in accordance with the contract documents. Furthermore, the steel fabricator shall indicate upon each shop drawing erection plan "This structure relies upon non-structural steel building components for final lateral strength and stability."

H. Welded Connections: Visually inspect all field-welded connections and test at least 20 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E 94.
   2. Ultrasonic testing performed in accordance with ASTM E 164.
   3. Liquid penetrant inspection performed in accordance with ASTM E 165.
   4. Magnetic particle inspection performed in accordance with ASTM E 709.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Structural floor, wall, and roof framing.
B. Floor, wall, and roof sheathing.
C. Preservative treatment of wood.
D. Fire retardant treatment of wood.
E. Miscellaneous framing and sheathing.
F. Telephone and electrical panel boards.
G. Wood nailers and curbs for roofing and items installed on roof.
H. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, and wood trim.
I. Miscellaneous wood nailers and furring strips.

1.2 RELATED SECTIONS
A. Section 06114 - Wood Blocking and Curbing
B. Section 09260 - Gypsum Board Assemblies

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. AFPA T10 - Wood Frame Construction Manual; American Forest and Paper Association.
C. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
D. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association.
E. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
F. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
G. PRI - 400 - Performance for APA EWS I-Joists; The Engineered Wood Association.
H. PRL-501 - Performance Standard for APA EWS Laminated Veneer Lumber; The Engineered Wood Association.
I. F405 - APA Performance Rated Panels; The Engineered Wood Association.
J. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials and application instructions.
C. Samples: For rough carpentry members that will be exposed to view, submit two samples 12 inches in size illustrating wood grain, color, and general appearance.
D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.5 QUALITY ASSURANCE
A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
B. Do not use split, warped, twisted or otherwise damaged or unacceptable members. All such members shall be removed from the site at the discretion of the Architect.
C. Do not use moisture damaged materials. All such materials shall be removed from the site at the discretion of the Architect.

1.6 QUALIFICATIONS
A. Design structural site fabricated trusses under direct supervision of a Professional Structural Engineer experienced in design of such trusses and licensed in the State in which the Project is located.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
B. Protect site fabricated trusses from warping or other distortion by stacking in vertical position, braced to resist movement.

PART 2 – PRODUCTS

2.1 SECTION INCLUDES

A. Grading Agency: Western Wood Products Association (WWPA).
B. Sizes: Nominal sizes as indicated on drawings, S4S.
C. Moisture Content: S-dry or MC19.
D. Stud Framing (2 x 2 through 2 x 6):
    1. Species: Douglas Fir-Larch.
    2. Grade: Select Structural.
E. Joist, Rafter, and Small Beam Framing (2 x 6 through 4 x 16):
    1. Machine stress-rated (MSR) as follows:
        a. Fb-single (minimum extreme fiber stress in bending): 1350 psi.
        b. E (minimum modulus of elasticity): 1,300,000 psi.
    2. Species: Douglas Fir-Larch.
F. Miscellaneous Blocking, Furring, and Nailers:
    1. Lumber: S4S, No. 2 or Standard Grade.

2.2 EXPOSED DIMENSION LUMBER

A. Grading Agency: Western Wood Products Association (WWPA).
B. Sizes: Nominal sizes as indicated on drawings, S4S.
C. Moisture Content: S-dry or MC19.
D. Stud Framing (2 x 2 through 2 x 6):
    1. Species: Douglas Fir covered as shown in drawings.
    2. Grade: Select Structural.
E. Joist, Rafter, and Small Beam Framing (2 x 6 through 4 x 16):
    1. Species: Douglas Fir.
    2. Grade: Select Structural covered as shown in drawings.

2.3 EXPOSED BOARDS

A. Moisture Content: Kiln-dry (15 percent maximum).
B. Surfacing: S4S.
C. Species: Douglas Fir.
D. Grade: No. 2, 2 Common, or Construction.

2.4 CONSTRUCTION PANELS

A. Sub-floor/Underlayment Combination: APA Rated OSB Stud-I-Floor.
    1. Exposure Class: Exposure 1.
    2. Span Rating: 16 inches.
    3. Thickness: 3/4 inches, nominal.
B. APA Rated OSB Sub-flooring:
    1. Exposure Class: 1.
    2. Span Rating: 32/16 inches.
C. Plywood Sub-flooring: PS 1, Grade C-D, Exposure I.
    1. Size: Nominal 3/4 inch in 4 foot by 8 foot sheets.
D. APA Rated OSB Roof Sheathing: Exposure 1, and as follows:
    1. Structural I.
    2. Span Rating: 24/16.

E. Plywood Roof Sheathing: PS 1, Grade C-D, Exposure I.
   1. Size: 3/4 inch nominal thickness in 4 foot by 8 foot sheets.
F. FAPA Rated OSB Wall Sheathing: Exposure 1, and as follows:
   1. Structural I.
   2. Span Rating: 24/16.
G. Plywood Wall Sheathing: PS 1, Grade C-D, Exposure I.
   1. Size: Nominal 1/2 inch in 4 foot by 8 foot sheets.
H. Miscellaneous Panels:
   1. Concealed Plywood: PS 1, C-C Plugged, exterior grade.
   2. Exposed Plywood: PS 1, A-D, interior grade.
   3. Electrical Component Mounting: APA rated sheathing, fire retardant treated.

2.5 ACCESSORIES

A. Fasteners and Anchors:
   1. Fasteners: Hot-dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
B. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
D. Sill Flashing: As specified in Section 07620.
E. Subfloor Glue: Waterproof, water base, air cure type, cartridge dispensed.
F. Building Paper: No. 30 asphalt felt.
G. Termite Shield: copper.

2.6 FACTORY WOOD TREATMENT

A. Fire Retardant Treatment: AWPA Treatment C20, Interior Type A Low Temperature (low hygroscopic), chemical treatment pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 / 450.
B. Pressure Treatment of Lumber Above Grade: AWPA Treatment C2 using waterborne preservative to 0.25 lb/cu ft retention.
   1. Kiln dry after treatment to maximum moisture content of 19 percent.
   2. Treat wood in contact with roofing, flashing, or waterproofing.
   3. Treat wood in contact with masonry or concrete.
   4. Treat wood less than 18 inches above grade.
C. Pressure Treatment of Lumber in Contact with Soil: AWPA Treatment C2 using waterborne preservative designated in AWPA C2 as suitable for ground contact use to 0.4 lb/cu ft retention.

PART 3 – EXECUTION

3.1 FRAMING INSTALLATION

A. All framing shall be Platform type as put forth in AFPA T10- Balloon Framing is not permissible.
B. Unless otherwise noted, all framing members shall be spaced at 16 inch on center intervals and secured with a minimum of five 10d toenails or screws at the end of each member.
C. Install all framing members in compliance with detailing presented in AFPA T10 - Wood Frame Construction Manual- unless exceeded herein.
D. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
E. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
F. Install structural members full length without splices unless otherwise specifically detailed.

G. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed and comply with fasteners listed above.
I. Provide solid blocking at all joists and other framing in excess of 8 feet span. Provide solid blocking at 8 feet on center across all floor joists. Fit solid blocking at ends of joists over all supporting members.
J. Provide continuous double 2 inch by 4 inch stiffeners over all ceiling joists at 8 foot centers or at mid span for members less than 16 feet. Stiffeners shall by constructed of one flat 2 inch by 4 inch member, with one 2 inch by 4 inch member on edge and nailed to flat member and joists on 16 inch centers.
K. Provide solid blocking at framing in excess of 8 feet span and as detailed. Fit solid blocking at ends of members.
L. Fire blocking: install solid fire blocking of identical sized material to studs or joists between floors where balloon framing is encountered and over all supporting girders or beams.
M. Frame openings with two studs at each jamb for openings not exceeding 4 foot; Frame openings with three studs at each jamb for openings from 4 foot to 8 foot; Frame openings with 5 studs at each jamb for openings exceeding 8 foot; support headers on cripple studs at each end and at center to center spacing.
N. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.2 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

A. Place full width continuous sill flashings or termite shield under framed walls over sill gasket. Lap flashing joints 4 inches and seal.
B. Place sill gasket directly on cementitious foundation. Puncture gasket cleanly and fit tightly to protruding foundation anchor bolts.
C. Coordinate installation of LVL beams, wood decking, wood chord metal joists, glue laminated structural units, prefabricated wood trusses, and plywood web joists.
D. Install I-joists in compliance with manufacturer's recommended procedures unless exceeded herein. Provide continuous rim joists at outer edges of all joists both parallel and perpendicular to joists.
E. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
F. Coordinate curb installation with installation of decking and support of deck openings.
G. See Section 06114 for installation of wood blocking and curbing for roof applications.

3.3 INSTALLATION OF CONSTRUCTION PANELS

A. Install telephone and electrical panel back boards made of plywood or other acceptable structural panels at locations indicated. Size back boards to be minimum 6 inches beyond size of telephone and electrical panels.
B. Sub-flooring/Underlayment Combination: Glue and nail to framing using minimum 2 1/2 inch long nails; staples are not permitted.
C. Sub-flooring: Glue and nail to framing using minimum 2 1/2 inch long nails; staples are not permitted.
D. Underlayment: Secure to sub-flooring with nails and glue.
    1. At locations where resilient flooring will be installed, fill and sand splits, gaps, and rough areas.
    2. Place building paper between floor underlayment and sub-flooring.
E. Roof Sheathing: Secure panels perpendicular to framing members, with ends staggered and sheet ends over firm bearing.
    1. Use sheathing clips between roof framing members.
    2. Provide solid edge blocking between sheets.
    3. Screw panels to framing with galvanized screws; staples are not permitted.

F. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws of minimum 2 inch length.
   1. Use plywood at building corners, for not less than 96 inches, measured horizontally.
   2. Place building paper horizontally over wall sheathing, weather lapping edges and ends.

3.4 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
B. Allow preservative to dry prior to erecting members.

3.5 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.
B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 06114

WOOD BLOCKING AND CURBING

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Roof nailers and curbs.
B. Blocking in wall and roof openings.
C. Preservative treatment of wood.
D. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and all wall mounted items.

1.2 RELATED SECTIONS
A. Section 06100: Rough Carpentry.
B. Section 09260: Gypsum Board Assemblies.

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
C. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association.
D. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
F. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; Redwood Inspection Service.
G. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.
H. WCLB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau.
I. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials.

1.5 QUALITY ASSURANCE
A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
   1. Acceptable Lumber Inspection Agencies: RIS, SPIB, WCLB, and WWPA.
   2. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
B. Plywood: Comply with PS 1.

PART 2 – PRODUCTS

2.1 DIMENSION LUMBER
A. Grading Agency: Western Wood Products Association (WWPA).
B. Sizes: Nominal sizes as indicated on drawings, S4S. Wood blocking for all wall mounted items shall be 2 x 6 inch nominal unless otherwise noted.
C. Moisture Content: S-dry or MC19.
D. Miscellaneous Blocking, Furring, and Nailers:
   1. Structural grade 1200fb Douglas Fir as defined in Section 06100.

2.2 CONSTRUCTION PANELS

A. Plywood Sheathing: PS 1, Grade C-D, Exposure I. Panels shall be treated as listed in the Factory Wood Treatment article of this section and as listed in the schedule.
B. All other panels as listed in Section 06100.

2.3 ACCESSORIES

A. Fasteners and Anchors:
   1. Fasteners: Hot-dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
   2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Anchor bolt for anchorage into cavity walls.

2.4 FACTORY WOOD TREATMENT

A. Wood preservative pressure treatment: ACQ Type D preservative; retention level .25
   1. Kiln dry after treatment to maximum moisture content of 19 percent.
   2. Treat wood in contact with roofing, flashing, or waterproofing.
   3. Treat wood in contact with masonry or concrete.
   4. Treat wood less than 18 inches above grade.
B. Fire Retardant Treatment: AWPA Treatment C20, Interior Type, Class A, Low Hygroscopic, Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 / 450.

PART 3 – EXECUTION

3.1 PREPARATION

A. Examine all surfaces to receive parts of the work specified herein. Application or installation of materials constitutes acceptance of the substrate.
B. Verify all dimensions of in-place and subsequent construction and that it accurately fit this part of the work to other construction.
C. Protect lumber and keep under cover both in transit and at job site. Protect from dampness.

3.2 FRAMING

A. Set members level and plumb, in correct position.
B. Place horizontal members with crown side up.
C. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
D. Coordinate curb installation with installation of decking and support of deck openings.
E. All wood blocking that is installed is to be temporarily protected form moisture utilizing 15 lb. roofing felt.
F. All wood blocking joints to be mitered @ 45 degrees, staggered, and screw fastened together.
G. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.3 INSTALLATION OF CONSTRUCTION PANELS

A. Sheathing: Secure with long dimension perpendicular to framing members, with ends over firm bearing and staggered, using screws.

3.4 SCHEDULES

A. Roof Blocking: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment. Roof edge and roof related wood blocking.
B. Treated plywood: Roof edge and roof related conditions.
C. Miscellaneous wood blocking exterior: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment.

D. Miscellaneous wood blocking interior: Provide wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and all other wall mounted items. Utilize material as listed in this section and in section 06100. Wood blocking for wall mounted items shall be minimum of 2 x 6 inch nominal dimensional lumber. Fasten wood blocking with minimum 2 screws each side into framing. Where conflicts occur, the more astringent requirement shall prevail.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Finish carpentry items.
B. Hardware and attachment accessories.

1.2 RELATED SECTIONS
A. Section 08211 - Flush Wood Doors.
B. Section 09900 - Paints and Coatings: Painting and finishing of finish carpentry items.

1.3 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. ANSI A208.1 - American National Standard for Particleboard.
C. AWI (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute.
D. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.
E. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements for submittal procedures.
B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.

1.5 QUALITY ASSURANCE
A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.
B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.

1.6 REGULATORY REQUIREMENTS
A. Comply with applicable code for fire retardant requirements.

1.7 DELIVERY, STORAGE, AND PROTECTION
A. Protect work from moisture damage.

1.8 PROJECT CONDITIONS
A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 – PRODUCTS

2.1 SHEET MATERIALS
A. Softwood Plywood: PS 1 Grade A-B; Veneer core;
B. Particleboard: ANSI A208.1; composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.

2.2 PLASTIC LAMINATE MATERIALS
A. Plastic Laminate: NEMA LD 3, HGS; color as selected by Architect; textured, low gloss finish.
B. Low Pressure Laminate: Melamine; solid color, and matte surface texture.

2.3 ADHESIVE

A. Adhesive: Type recommended by laminate manufacturer to suit application.

2.4 FASTENERS

A. Fasteners: Of size and type to suit application; finish with wood filler in concealed and exposed locations.

2.5 ACCESSORIES

A. Wood Filler: Solvent based, tinted to match surface finish color.

2.6 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.
B. Cap exposed plastic laminate finish edges with material of same finish and pattern.
C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

2.7 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.
B. Apply wood filler in exposed nail and screw indentations.
C. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.
B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

A. Set and secure materials and components in place, plumb and level.
B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.3 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
B. Site Finishing: Refer to Section 09900.

3.4 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.
B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06411

PLASTIC LAMINATE-CLAD CASEWORK

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Cabinet hardware.
B. Plastic laminate casework units.

1.2 REFERENCES
A. Unless otherwise noted the most current issue of the reference shall be used.
B. AWI P-200 - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute.
C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.
D. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association.

1.3 SUBMITTALS
A. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
B. Product Data: Provide data for hardware accessories.
C. Samples: After selection of color by Architect, submit two, 12 x 18 inch in size, illustrating cabinet finish, counter top finish, and edge conditions.
D. Samples: Submit two samples of drawer pulls, hinges, slides, and other accessories illustrating hardware finish and design.

1.4 QUALITY ASSURANCE
A. Perform all work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom quality, except that all sight exposed shelving and casework interior surfaces of open shelving units shall be clad in high pressure laminate of type to match that used for door and drawer fronts.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

1.5 DELIVERY, STORAGE, AND PROTECTION
A. Protect units from moisture damage.

1.6 ENVIRONMENTAL REQUIREMENTS
A. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

1.7 WARRANTY
A. All materials and fabrication covered by this section shall carry a 3 year warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS – PLASTIC LAMINATE CASEWORK UNITS
A. Stevens, 704 W. Main Street, Teutopolis, IL 62467 Phone: (217) 857-6411
B. Case Systems, P.O. Box 2044, Midland, MI 48641Phone: (517) 835-7773
C. TMI, 050 3rd Avenue, West Dickinson, ND 58601Phone: (701) 225-6716
D. Substitutions: Custom fabricated casework units shall be permitted with approval of Architect. Custom fabricated units shall meet or exceed quality of construction indicated in specifications and level of quality provided by specified manufacturers.

2.2 MANUFACTURERS - PLASTIC LAMINATE

A. Manufacturers:
   1. Formica Corp.
   2. Nevamar Corp.
   3. Wilsonart International, Inc.
   4. Pionite.

B. Color, pattern and texture to be selected by Architect from any of the above manufacturer's full lines.

C. Laminate Color Selections
   1. Basic Cabinet Body Color:
      a. To include closed interior surfaces of all components, including drawer boxes, to be covered with melamine laminate as a minimum requirement; drawer boxes not matching basic color will be rejected.
      b. Melamine laminate shall be available in manufacturer's standard dove grey, frosty white, or light beige color. Two colors may be selected.
      c. Colors for sight exposed cabinet surfaces, including open shelving and interiors of doorless cabinets, grade GP28, shall be selected from the manufacturer's current year laminate series.
      d. Colors for countertop grades, GP50 and PF42, shall be selected from the manufacturer's current year standard solid and patterned laminate series.

2.3 LAMINATE MATERIALS

A. Laminates shall be thermally fused to meet the performance requirements of ANSI/NEMA 3 LD – 2000 for GP-28 Cabinet.

B. Definition: Identification of casework components by surface visibility. Listed are definitions and materials commonly used in defining decorative laminate clad casework. Refer to Fabrication section for those items selected for use on this project.
   1. Open Interiors: Any open storage unit without solid door or drawer fronts and units with full glass doors and/or acrylic doors.
   2. Closed Interiors: Any closed storage unit behind solid door or drawer fronts, sliding solid doors.
   3. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
   4. Other Exposed Surfaces: Faces of doors and drawers when closed, tops of cabinets less than 72" above finished floor.
   5. Semi-Exposed Surfaces: Interior surfaces which are visible, bottoms of wall cabinets and tops of cabinets 72" or more above finished floor.
   6. Concealed Surfaces: Any surface not visible after installation.

C. Decorative Laminates / Veneer Where Applicable:
   1. High pressure decorative laminate GP28 (.028), NEMA Test LD-3-1995
   2. High pressure decorative laminate PG50 (.050), NEMA Test LD-3-1995.
   3. High pressure decorative laminate PF42 (.042), NEMA Test LD-3-1995.
   4. High pressure cabinet liner CL20 (.020), NEMA Test LD-3-1995.
   5. Melamine laminate tested to meet NEMA Test LD
   6. High pressure backer BK20 (.020).

D. Side panels, back, top, drawer fronts, and doors shall be ¾" thick particleboard, laminated on the exterior with high pressure decorative laminate GP28 and on the closed interiors with high pressure cabinet liner CL20 in dove grey, frosty white, or light beige color to match basic cabinet body color selected for project. All exposed edges shall be finished with machine applied OBC banding, 3mm thickness.

E. Substrate: Particleboard: ANSI A208.1; Grade M-3 Industrial; type as specified in AWI Architectural Woodwork Quality Standards Illustrated, composed of wood chips, medium density, made with high waterproof resin adhesive; of grade to suit application; sanded faces, located as described in fabrication.

2.4 ACCESSORIES

A. Adhesive: FS MMM-A-130 contact adhesive. Type recommended by AWI and laminate manufacturer to suit application. All adhesives shall be mechanically applied.
B. PVC Edge Trim: Edging Materials / Colors
   1. 3mm PVC banding, machine applied with waterproof hot melt adhesive with external edges and outside corners of door and drawer fronts, and countertops, machine profiled to 1/8" radius for safety.
   2. PVC banding shall be available in colors matched to manufacturer's laminates of the same name. Width shall match component thickness. Color to be chosen by Architect from manufacturer's full range. Architect may choose color rather than matching laminate.
   3. Barbed T-edging or laminate self-edge on cabinet components will not be acceptable.
   4. Undercounter support frames, legs and miscellaneous metal parts shall be furniture steel unless noted otherwise, welded, degreased, cleaned, treated and epoxy powder painted in standard colors to match basic cabinet body color, or in a contrasting color
C. Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate.

2.5 HARDWARE

A. Hardware: BHMA A156.9. Unless exceeded herein.
B. Internal Shelf Standards and Brackets: Where rear support of shelving is required standards shall be heavy duty recessed formed channels, cut for heavy duty shelf brackets with CAM lock lever. Electroplated or powder coated finish as selected by Architect.
   1. Adjustable Shelf Supports:
      a. Shall be injection molded polycarbonate, clear color to blend with selected interior finish, friction fit into cabinet end panels and vertical dividers, readily adjustable on 32mm (approximately 1¼") centers. Each shelf support shall have two (2) integral support pins, 5mm diameter, to interface pre-drilled holes, and to prevent accidental rotation of support. The supports shall be automatically adaptable to ¾" or 1" thick shelving and shall provide non-tip feature for shelving. Supports are designed to readily permit field fixing of shelf if desired. Structural load testing shall show loading to 1,040 pounds (260 lbs. per support) without failure.
C. Door Pulls: Front pull shall be epoxy finished metal wire style, 96mm spacing on fasteners. Available in epoxy finish, or brushed chrome, color to be selected by Architect. Pull design shall be compatible with Americans with Disability Act (ADA), Federal Register Volume 56, No. 144, specifically Paragraph 4.27.4.
D. Drawer Slides:
   1. Standard Drawer: Self-closing, bottom mount epoxy coated with captive roller and positive in-stop. Slide shall have 100 lbs. load rating and must prevent drawer fronts from contacting the cabinet body. Drawer slides must meet or exceed Grade I requirements per ANSI/BHMA.
   2. File Drawer: Full extension, bottom mount epoxy coated with captive roller and positive in-stop. Slide shall have 100 lbs. load rating and must prevent drawer fronts from contacting the cabinet body. Drawer slides must meet or exceed Grade I requirements per ANSI/BHMA.
E. Cabinet Locks: Keyed cylinder, two keys per lock, 5 disc tumbler, cam type, master keyed, brushed chrome - US26D finish. Provide for each wardrobe unit; tall storage unit, and each door of all base and upper cabinet units.
F. Casters: 4” casters with 3” diameter wheels; 165 lbs load rating per caster; ball bearing with 360 degree swivel; non-marring locking wheel.
G. Countertop Supports: Powder coated, formed metal supports; provide attachment points between counter and wall; color to be selected by Architect.
H. Catches: Magnetic; minimum 7 lb. pull, provide 2 per door for units over 48 inches high. Elbow catches shall be used on inactive doors less than 73" tall.
I. Hinges:
   1. Shall be five knuckle, institutional grade, 2¾" overlay type with hospital tip.
   2. Steel shall be minimum .095" thick and have minimum of nine (9) edge and leaf fastenings.

3. Hinges shall pass ANSI-BMHA standard A156.9, Grade 1 requirement for both vertical and horizontal set and sag (pair of hinges will hold minimum of 310 lbs); copy of test result shall be provided upon request.
4. Casework manufacturer shall use specifically engineered screws for attachment of hinges; wood screws shall not be permitted.
5. Doors 48" and over in height shall have three (3) hinges per door.
6. Available in epoxy finish, or brushed chrome.

2.6 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
C. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
D. Fabricate casework to dimensions, profiles, and details shown.
E. Plastic Laminate Cabinet Body Construction:
   1. Tops and bottoms shall be joined to cabinet ends and internal cabinet components such as fixed horizontals, rails and verticals shall be joined using 10mm diameter industrial grade hardwood dowels, laterally fluted with chamfered ends, securely glued and clamped under pressure during assembly to secure joints and cabinet squareness. Use minimum of six (6) dowels at each joint for 24 in. deep cabinet and minimum of four (4) dowels at each joint for 12" deep cabinets.
   2. Unless specifically indicated, core shall be ¾" thick particleboard. Edging and surface finishes as indicated herein.
   3. Backs shall be ¾" particleboard, color matched to cabinet interior, exterior surface GP28 laminate as selected.
   4. All fixed undercounter units shall have individual factory applied base, constructed of ¾" moisture resistant plywood. Base shall be 96mm (nominal 4") high unless otherwise indicated on the drawings.
   5. All undercounter units, shall be provided with full sub-top. No exceptions will be permitted.
   6. All end panels and vertical dividers shall be prepared to receive adjustable shell hardware at 32mm (approximately 1¼") centers. Door hinge, drawer slides and pull-out shelves shall mount on line boring to maintain vertical alignment of components and provide for future relocation of doors, drawers, shelves and/or pull-out shelves.
   7. All exposed and semi exposed edges of basic cabinet components shall be factory edged with PVC banding, machine applied with waterproof hot melted adhesive.
      a. Edging shall be 3mm PVC, available in complimentary or contrasting colors.
   8. Front edge of shelves and unit shall be plastic laminate in color to match units.
   9. Interior finish, units with closed interiors:
      a. Sides, top, bottom, horizontal, and vertical members, and adjustable shelving faced with melamine laminate with matching prefinished back.
   10. Exposed ends:
      a. Shall be faced with high pressure decorative laminate GP28 (.028) color from laminate manufacturer's full range.
   11. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), will not be permitted. No exceptions.
F. Plastic Laminate Door Fronts:
   1. Core for all door fronts shall be ¾" thick particleboard, reveal overlay style. All edges shall be finished as indicated herein.
   2. Double doors shall be used on all cabinets in excess of 24" wide.
G. Plastic laminate exterior faces shall be laminated with high-pressure decorative laminate GP28, color as selected. Interior face shall be high-pressure cabinet liner CL20.

H. All edges of Plastic Laminate units shall be finished with 3mm PVC. External edges and outside corners shall be machine profiled to 1/8" radius.
   1. All nominal 1" thick laminate clad countertops shall be constructed with 1" particleboard core laminated top face with GP50 (.050) high-pressure decorative laminate, with BK20 backer underside.

PART 3 – EXECUTION

3.1 EXAMINATION
A. Verify adequacy of backing and support framing in both existing spaces to receive casework and new spaces to receive casework
B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION
A. Set and secure casework in place; rigid, plumb, and level.
B. Use fixture attachments in concealed locations for wall mounted components.
C. Use concealed joint fasteners to align and secure adjoining cabinet units.
D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
E. Secure cabinet to floor using appropriate angles and anchorages.
F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING
A. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING
A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 06651

SOLID SURFACE COUNTERTOPS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Countertops for architectural cabinetwork.

1.2 RELATED REQUIREMENTS
A. Section 06100 – Rough Carpentry.
B. Section 06114 – Wood Blocking and Curbing.
C. Section 06411 – Plastic Laminate Clad Casework

1.3 SUBMITTALS
A. See Section 01300 - Submittals, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Material Safety Data Sheets for all products and accessories.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Specimen warranty.
C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
   1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
   2. Show full-size details, edge details, thermoforming requirements, attachments, etc.
   3. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
   4. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.
D. Verification Samples: For each finish product specified, minimum size 4 inches (125 mm) square, representing actual product, color, and patterns.
E. Test Reports:
   1. Chemical resistance testing, showing compliance with specified requirements.
   2. Flammability test reports.
   3. Food preparation zone use test reports.
F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.4 QUALITY ASSURANCE
A. Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
B. Fabricator/installer qualifications: Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Deliver no components to project site until areas are ready for installation.
B. Store components indoors prior to installation.
C. Handle materials to prevent damage to finished surfaces.
D. Provide protective coverings to prevent physical damage or staining following installation for duration of project.
E. Store products in manufacturer's unopened packaging until ready for installation.
F. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results for a minimum of 72 hours prior to and continuously following installation. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.7 WARRANTY

A. Provide manufacturer’s warranty against defects in materials.
   1. Warranty shall provide material and labor to repair or replace defective materials.
   2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
B. Manufacturer’s warranty period:
   1. Ten years from date of substantial completion.

PART 2 – PRODUCTS

2.1 MAUFACTURERS

A. Hanwha L&C: Hanex Solid Surfaces; www.hanwhasurfaces.com.
B. Wilsonart: Solid Surface; www.wilsonartcontract.com.
C. Dupont: Corian Surfaces; www2.dupont.com.
D. Samsung Chemical USA: Staron Solid Surfaces; www.staron.com.
E. Substitutions: Not Permitted.

2.2 COUNTERTOP ASSEMBLIES

A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch, minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISSFA-2 and NEMA LD 3; 100% acrylic resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. NSF 51 Approved – Food Prep.
      b. Indoor Air Quality Certification:
         1) GREENGUARD Children and Schools Certification
         2) SCS Scientific Certification Systems
      c. Quality Assurance & Environmental Awareness Certifications
         1) SGS Certification
         2) ISO 9001 KFQ Certification
         3) ISO 14001 KFQ Certification
      d. Finish on Exposed Surfaces:
      e. Color and Pattern: Basis of Design: For proposal purposes only: Group C
         1) Owner/Architect may choose a different color from price points Groups A, B during shop drawings.
   3. Other Components Thickness: 1/2 inch, minimum.
   4. Finished Edge Treatment: To be selected by Architect from Manufacturer’s standard range.
   5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
   6. Skirts: As indicated on Drawings.
   1. Fire test response characteristics:
      a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:

1) Flame Spread Index: 25 or less.

2. Smoke Developed Index: 450 or lessFire test response characteristics:
   a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:

      1) Flame Spread Index: 25 or less.
      2) Smoke Developed Index: 450 or less.

2.3 MATERIAL PERFORMANCE CHARACTERISTICS

Property	Typical Result	Test
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5 x 10^{-6} psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2 x 10^{-6} psi	ASTM D 790
Hardness	>85	Rockwell “M” Scale ASTM D 785
	56	Barcol Impressor ASTM D 2583
Thermal Expansion	3.02 x 10^{-5} in./in./°C (1.80 x 10^{-5} in./in./°F)	ASTM D 696
Gloss (60° Gardner)	5–75 (matte—highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000 Method 3.3
Wear and Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance: Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM G21 & G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000 Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000 Method 3.6

Izod Impact	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact Resistance: Sheets	No fracture—1⁄2 lb. ball: 1⁄4" slab—36" drop 1⁄2" slab—144" drop	NEMA LD 3-2000 Method 3.8
Weatherability	ΔE^*_{94}<5 in 1,000 hrs.	ASTM G 155
Specific Gravity	1.7	
Water Absorption	Long-term 0.4% (3⁄4") 0.6% (1⁄2") 0.8% (1⁄4")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test (“LC50”Test)
Flammability	All colors	ASTM E 84, (Class I and Class A) NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.

NEMA results based on the NEMA LD 3-2000

2.4 ACCESSORY MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
B. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2, no added urea-formaldehyde.
C. Joint Adhesives: Manufacturer’s standard chemical resistant one- or two-part adhesive kit to create inconspicuous, nonporous joints.
D. Cove Molding for Top of Splashes: Rubber with semi-gloss finish and T-spline to fit between splash and wall; 1/2 inch by 1/2 inch; color to be selected from manufacturer’s complete line.
E. Joint Sealant: Manufacturer’s standard mildew-resistant, FDA-compliant, NSF 51-compliant, UL-listed silicone sealant in colors matching components.
F. Sink/lavatory mounting hardware: Manufacturer’s standard bowl clips, panel inserts and fasteners for attachment of undermount sinks/lavatories.
G. Conductive tape: Manufacturer’s standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
H. Insulating felt tape: Manufacturer’s standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.5 FABRICATION

A. Fabricate in accordance with standards governing fabrication quality that are specified in Section.
B. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
C. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches, unless otherwise indicated.
D. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
E. Wall-Mounted Counters: Provide skirts and aprons as indicated on drawings, finished to match.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Owner' Representative of unsatisfactory preparation before proceeding.
C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
B. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
C. Provide product in the largest pieces available.
D. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
E. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
F. Cut and finish component edges with clean, sharp returns.
G. Rout radii and contours to template.
H. Anchor securely to base cabinets or other supports using concealed fasteners. Make flat surfaces level; shim where required.
I. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
J. Carefully dress joints smooth, remove surface scratches and clean entire surface.
K. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.
L. Attach solid surface countertops using manufacturer's recommended adhesive.

M. Coved backsplashes and applied sidesplashes:
   1. Install applied sidesplashes using manufacturer’s standard color-matched silicone sealant.
   2. Adhere applied sidesplashes to countertops using manufacturer’s standard color-matched silicone sealant.

N. Coved backsplashes and sidesplashes:
   1. Provide coved backsplashes and sidesplashes at all walls and adjacent millwork.
   2. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on the drawings.
   3. Adhere to countertops using manufacturer’s standard color-matched Joint Adhesive.

3.4 CLEANING

A. Clean countertops surfaces thoroughly.

3.5 REPAIR

A. Repair minor imperfections and cracked seams and replace sections of severely damaged surfaces in accordance with manufacturer's recommendations and instructions.

3.6 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

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:
        a. With minimum 3 years documented experience installing work of this type.
        b. Able to show at least 5 satisfactorily completed projects of comparable size and type.
        c. Licensed by authority having jurisdiction.
        d. 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 RELATED SECTIONS
A. Section 08800 – Glazing: Glazing sealants and accessories.
B. Section 09260 – Gypsum Board Assemblies: Acoustic Sealant.
C. Section 09300 – Tile: Sealant used as tile grout.

1.3 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.

1.4 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.

1.5 QUALITY ASSURANCE
A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience and approved by manufacturer.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.7 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.
C. Type S3 - Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Color: N/A.
   2. Applications:
      a. For concealed locations only.
      b. Sealant bead between top stud runner and structure; and between bottom stud track and floor.
D. Type S4 - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; single component.
   1. Color: As selected by Architect from Manufacturer's full line of colors.
   2. Applications:
      a. Approved by manufacturer for wide joints up to 1-1/2 inches.
      b. Expansion joints in floors.
E. Type S5 - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, I, M and A; single component.
   1. Color: As selected by Architect from Manufacturer's full line of colors.
   2. Applications:
      a. Joints in sidewalks and vehicular paving.
      b. Compressible filler joints adjacent to foundations.

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. Control and Expansion Joints in Paving: Type S5.
C. Exterior Wall Expansion Joints: Type S1.
D. Joints Between Exterior Metal Frames and Adjacent Work (except masonry): Type S1.
E. Interior Joints for Which No Other Sealant is Indicated: Type S2.
F. Control and Expansion Joints in Interior Concrete Slabs and Floors: Type S4.
G. In STC-Rated Walls, Between Metal Stud Track/Runner and Adjacent Construction: Type S3.
H. Joints Between Plumbing Fixtures and Walls and Floors, and Between Countertops and Walls: Type S2.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Steel frames for wood doors.
B. Steel glazing frames.

1.2 RELATED SECTIONS
A. Section 08211 - Flush Wood Doors.
B. Section 08710 - Door Hardware.
C. Section 08800 - Glazing: Glass for doors and borrowed lites.
D. Section 09900 - Paints and Coatings: Field painting.

1.3 REFERENCES
A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.
B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 1998.
C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998.
D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2002a.
E. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 1997.
F. NAAMM HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 1999.
G. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 1992.
H. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2000.
I. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.
J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 1999.
K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE
A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum Five years documented experience.
B. Maintain at the project site a copy of all reference standards dealing with installation.

1.6 DELIVERY, STORAGE, AND PROTECTION
A. Store in accordance with NAAMM HMMA 840.
B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 – PRODUCTS

2.1 MANUFACTUERS

A. Steel Doors and Frames:
   1. Ceco Door Products; www.cecodoor.com.
   2. Curries; www.curries.com.
   3. Kewanee Corp., Kewanee, IL.
   4. LaForce Inc.; www.laforceinc.com.
   5. Republic Builders Products; www.republicdoor.com.
   6. Steelcraft Manufacturing Co; www.steelcraft.com.
   7. Trussbilt; www.trussbilt.com.
   8. Substitutions: See Section 01600 - Product Requirements.

2.2 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Door Top Closures: Flush with top of faces and edges.
   2. Door Edge Profile: Beveled on both edges.
   3. Door Texture: Smooth faces.
   4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   5. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   6. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), Manufacturer's standard coating thickness.
   7. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.3 STEEL FRAMES

A. General: Provide fully welded frames.
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. Provide 16 gage frames, except provide #14 gauge galvanized for exterior doors.
   2. Hardware Reinforcing:
      a. Butts and Pivots: 1/4-inch thick.
      b. Locks: # 12 gauge.
      c. Surface Applied Hardware: #12 gauge.
      d. Dust Covers: #20 gauge.
   3. Frame Anchors: #14 gauge, corrugated "T" anchors.
      a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gauge
   4. Minimum Reinforcing Size:
      a. Butts and Pivots: Full width of frame by 10-inches long.
      b. Closers: Full width of frame by 18-inches long.
      c. Locks: As required by template.
      d. Other Surface Applied Hardware: As required by template.
   5. Finish: Factory primed, for field finishing.
      a. Frame installer shall coat the interior portion of all exterior frames with a bituminous coating after factory priming and prior to installation (both jambs).
   6. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
   7. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

8. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
9. Interior Door Frames, Non-Fire-Rated: Fully welded type.
10. Interior Door Frames, Fire-Rated: Fully welded type.
    a. Fire Rating: Same as door, labeled.

B. Mullions for Pairs of Doors: Fixed, of profile similar to jambs.
C. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.
D. Transom Bars: Fixed, of profile same as jamb and head.

2.4 ACCESSORY MATERIALS

A. Glazing: As specified in Section 08800.
B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
C. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited unless approved in writing by Architect for areas only inaccessible to troweling during installation.
D. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
E. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.5 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.
B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that opening sizes and tolerances are acceptable.

3.2 PREPARATION

A. Frame installing contractor shall coat inside of frames to be installed in masonry or to be grouted, with bituminous coating prior to installation as noted. Apply wet to 18.0 mils (450 microns) in one or two coats. Total dry film thickness of not less than 12 mils (300 microns) or in excess of 30 mils.

3.3 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
B. In addition, install fire rated units in accordance with NFPA 80.
C. Coordinate frame anchor placement with wall construction.
D. Grout frames in solid masonry construction; brace frames so that pressure of grout before setting will not deform frames.
E. Coordinate installation of hardware.
F. Coordinate installation of glazing.
G. Whenever possible, leave frame spreaders intact until frames and masonry are set perfectly square and plumb and all anchors are securely attached. Grout all frames solid.
H. Coordinate installation of electrical connections to electrical hardware or security devices.
I. Grind, bondo, sand, prime and paint over grout holes, anchor heads and any imperfections in frame.
J. Touch up damaged factory finishes.

3.4 ERECTION TOLERANCES

A. Clearances between Door and Frame: As specified in ANSI A250.8.
B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.
C. Do not erect members which are observed to be warped, bowed, deformed, or otherwise damaged or defaced to such an extent as to impair strength or appearance. Remove and replace members which have been damaged in the process of erection.

3.5 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.6 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08211

FLUSH WOOD DOORS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Flush wood doors; flush configuration; fire rated and non-rated.

1.2 RELATED SECTIONS
A. Section 08710 - Door Hardware.
B. Section 08800 - Glazing.
C. Section 09900 - Paints and Coatings: Site finishing of doors.

1.3 REFERENCES
A. AWI (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute; 1997, Seventh Edition, Version 1.0.
B. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.
C. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
D. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements for submittal procedures.
B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.

1.5 QUALITY ASSURANCE – NOT USED

1.6 REGULATORY REQUIREMENTS
A. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.7 DELIVERY, STORAGE, AND PROTECTION
A. Package, deliver and store doors in accordance with specified quality standard.
B. Accept doors on site in manufacturer's packaging. Inspect for damage.
C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.8 PROJECT CONDITIONS
A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.9 WARRANTY
A. See Section 01780 - Closeout Submittals for additional warranty requirements.
B. Provide warranty for the following term:
C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials and telegraphing core construction

PART 2 – PRODUCTS

2.1 MANUFACTURERS
A. Veneer Doors:
1. Algoma Hardwoods, Algoma, WI.
2. Eggers Industries, Two Rivers, WI.www.eggersindustries.com.

3. Marshfield DoorSystems, Inc: www.marshfielddoors.com. (formerly Weyerhaeuser Door Division)
4. Oshkosh Architectural Door Company, Oskosh, WI
5. V.T. Industries, Holstein, IA
6. Substitutions: See Section 01600 - Product Requirements.

2.2 DOORS AND PANELS

A. All Doors: See drawings for locations and additional requirements.
B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations unless otherwise noted.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C or UBC Standard 7-2-97 ("positive pressure"); UL labeled.

2.3 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: AWI Architectural Woodwork Quality Standards Illustrated, Section 1300, Type PC - Particleboard; Grade 1-LD-1.
B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above.

2.4 DOOR FACINGS

A. Wood Veneer Facing for Transparent Finish: Species as specified above, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.
   1. Vertical Edges: Same species as face veneer.
B. Interior Doors - Veneer: red oak species, veneer grade as specified by door quality standard, plain sliced, with slip matched grain, for transparent finish.
C. Facing Adhesive: Type I - waterproof.

2.5 ACCESSORIES

A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

2.6 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.
B. Fabricate fire rated doors in accordance with UL requirements. Attach fire rating label to door.
C. Meeting Options for (Non-Rated) Double Doors: No Bevel
D. Provide solid blocks at lock edge for hardware reinforcement.
   1. Provide solid blocking for other through bolted hardware.
E. Vertical Exposed Edge of Stiles - Veneer Faces: Of same species as veneer facing.
F. Fit door edge trim to edge of stiles after applying veneer facing.
G. Bond edge banding to cores.
H. Transom Meeting Edge Options: Non-Rabbeted
I. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.

2.7 FACTORY FINISHING

A. Factory finish doors in accordance with AWI Quality Standards Illustrated, Section 1500 to the following finish designations:
   1. Transparent Finish: TR-6, transparent catalyzed polyurethane, Custom quality, Semi-Gloss sheen.
   2. Design intent is to match existing interior wood door color and finish.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that opening sizes and tolerances are acceptable.
C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80, Warnock Hersey, and UL requirements.
B. Trim non-rated door width by cutting equally on both jamb edges.
C. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).
D. Use machine tools to cut or drill for hardware.
E. Pilot drill screw and bolt holes.
F. Coordinate installation of doors with installation of frames and hardware.
G. Coordinate installation of glazing.

3.3 INSTALLATION TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.
B. Conform to specified quality standard for maximum diagonal distortion.

3.4 ADJUSTING

A. Adjust doors for smooth and balanced door movement.
B. Adjust closers for full closure.

3.5 SCHEDULE - See Drawings

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Other doors to the extent indicated.
B. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Electromechanical door hardware.
   3. Cylinders specified for doors in other sections.
C. Related Sections:
   1. Division 08 Section “Door Hardware Schedule”.
   2. Division 08 Section “Hollow Metal Doors and Frames”.
   3. Division 08 Section “Flush Wood Doors”.
   4. Division 08 Section “Access Control Hardware”.
D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. State Building Codes, Local Amendments.
E. Standards: All hardware specified herein shall comply with the following industry standards:
   1. ANSI/BHMA Certified Product Standards - A156 Series
   2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
   3. Content: Include the following information:
      a. Type, style, function, size, label, hand, and finish of each door hardware item.
      b. Manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
      e. Explanation of abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for door hardware.

g. Door and frame sizes and materials.
h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
   a. Keying Conference to occur prior to submitting door hardware schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:
   1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
      a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
      b. Complete (risers, point-to-point) access control system block wiring diagrams.
      c. Wiring instructions for each electronic component scheduled herein.
   2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
D. Proof of Certification: Provide copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified installer of Windstorm assemblies.
E. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
F. Informational Submittals:
   1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
G. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
   1. Function of building, purpose of each area and degree of security required.
   2. Plans for existing and future key system expansion.
   3. Requirements for key control storage and software.
   4. Installation of permanent keys, cylinder cores and software.
   5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
   1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
   2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
   3. Review sequence of operation narratives for each unique access controlled opening.
   4. Review and finalize construction schedule and verify availability of materials.
   5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
   1. Ten years for mortise locks and latches.
   2. Seven years for heavy duty cylindrical (bored) locks and latches.
   3. Five years for exit hardware.
   4. Twenty five years for manual surface door closer bodies.
   5. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 – PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

D. Substitutions: None permitted. Hardware listed is District Standard.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
   1. Quantity: Provide the following hinge quantity, unless otherwise indicated
      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
      a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
      b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
   a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 certified pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed teflon coated stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
   1. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt location approximately six feet from the floor.
   2. Furnish dust proof strikes for bottom bolts.
   3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
   4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

B. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
   1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
   2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
   3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
   4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years’ experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:
   1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
   2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
   3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
   4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
   5. Keyway:

D. District wide key system – Removable Core, Schlage 6 pin E Keyway, 0 bitted. Master Key System Code #470545

E. Key Quantity: Provide the following minimum number of keys:
   1. Change Keys per Cylinder: Two (2)
   2. Master Keys (per Master Key Level/Group): Five (5).
   3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.
G. Key Registration List (Bitting List):
   1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
   2. Provide transcript list in writing or electronic file as directed by the Owner.
H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
   1. Provide (1) key control cabinet per school.
I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Schlage ADA Lever Handled, type as specified below in Hardware Groups.
B. Cylindrical Locksets, Schlage ADA Lever Handled, type as specified below in Hardware Groups.

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
   4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
B. Standards: Comply with the following:
   1. Strikes for Mortise Locks and Latches: BHMA A156.13.
   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
   4. Dustproof Strikes: BHMA A156.16.

2.7 ELECTRIC STRIKES

A. Standard Electric Strikes: Heavy duty, cylindrical and mortise lock electric strikes conforming to ANSI/BHMA A156.31, Grade 1, UL listed for both Burglary Resistance and for use on fire rated door assemblies. Stainless steel construction with dual interlocking plunger design tested to exceed 3000 lbs. of static strength and 350 ft-lbs. of dynamic strength. Strikes tested for a minimum 1 million operating cycles. Provide strikes with 12 or 24 VDC capability and supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.
B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
   2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
   3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
   4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
   5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
      a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
      b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
   6. Vertical Rod Exit Devices: Provide and install interior surface and concealed vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
   7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
   8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
   9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
   10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
   1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
   2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
   3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
   4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
   5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
   7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt and security type fasteners as required for proper installation.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
C. Door Closers, Surface Mounted (Unitrol): Unitrol arms to have door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim
   1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
   2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
   3. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
      a. Stainless Steel: 300 grade, 050-inch thick.
   4. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
   1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
   1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

2.13 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
    1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
    1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
    2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
    3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
    4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
B. Clean adjacent surfaces soiled by door hardware installation.
C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the proposal process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
B. Manufacturer’s Abbreviations:
   1. ADA – Adams Rite
   2. GLY – Glynn-Johnson
   3. IVE – Ives
   4. LCN – LCN / Allegion
   5. SCH – Schlage
   6. VON – Von Duprin
   7. ZER – Zero International

3.9 HARDWARE GROUPS

HARDWARE GROUP NO. 1

FOR USE ON DOOR #(S):
102 126 126C

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
1	EA	CLASSROOM SECURITY	L9071P 17A	612	SCH
1	EA	SURFACE CLOSER	4040XP EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	612	IVE
1	EA	WALL STOP	WS406/407CCV	612	IVE

HARDWARE GROUP NO. 2

FOR USE ON DOOR #(S):
102A 102B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	639	IVE
1	EA	PRIVACY LOCK	L9040 17A	612	SCH
1	EA	SURFACE CLOSER	4040XP	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	612	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	612	IVE
1	EA	WALL STOP	WS406/407CCV	612	IVE

END OF SECTION

SECTION 08800

GLAZING

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Glass and plastic glazing.
B. Glazing compounds and accessories.

1.2 RELATED SECTIONS
A. Section 07900 - Joint Sealers: Sealant and back-up material.
B. Section 08110 - Steel Doors and Frames

1.3 REFERENCES
A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 1984 (R1994).
B. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1999.
C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2002.
D. ASTM C 1036 - Standard Specification for Flat Glass; 2001.
E. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 1997b.
F. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.
G. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 1997.
H. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

1.4 PERFORMANCE REQUIREMENTS
A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
   1. In conjunction with materials described in Section 07260 and 07900.
   2. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
   3. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

1.5 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.
C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
D. Samples: Submit two samples 12 x 12 inch in size of glass units.
E. Certificates: Certify that products meet or exceed specified requirements.
F. Manufacturer's Certificate: Certify that sealed insulated glass meets or exceeds specified requirements.

1.6 QUALITY ASSURANCE
A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods. Maintain one copy on site.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.7 PRE-INSTALLATION MEETING
A. Convene one week before starting work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.
B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
B. Provide a five year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 – PRODUCTS

2.1 FLAT GLASS MATERIALS

A. Manufacturers:
   1. Guardian Industries Corporation: www.guardian.com.
   2. Pilkington Building Products North America: www.pilkington.com.
   3. Visteon Glass Systems: www.visteon.com
   4. Substitutions: Refer to Section 01600 - Product Requirements.
B. Vision Glass (Type I-1): Clear; fully tempered with horizontal tempering.
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C 1048.
   2. Comply with ANSI Z97.1.

2.2 GLAZING COMPOUNDS

A. Manufacturers:
   1. Dow Corning Corp: www.dowcorning.com
   2. GE Plastics: www.geplastics.com
   3. Pecora Corporation: www.Pecora.com
   4. Substitutions: Refer to Section 01600 - Product Requirements.
B. Silicone Sealant: Single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

2.3 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 6 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; 3/8 inch size; black color.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.
B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.
B. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.

3.3 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
D. Place glazing tape on free perimeter of glazing in same manner described above.
E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
F. Knife trim protruding tape.

3.4 CLEANING

A. Remove glazing materials from finish surfaces.
B. Remove labels after Work is complete.
C. Clean glass and adjacent surfaces.

3.5 PROTECTION OF FINISHED WORK

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Metal stud wall framing.
B. Metal channel ceiling framing.
C. Cementitious backer board for interior applications.
D. Gypsum wallboard.
E. Fiber Reinforced Gypsum Board.
F. Joint treatment and accessories.

1.2 RELATED SECTIONS
A. Section 06100 – Rough Carpentry: Building framing system and Gypsum sheathing.
B. Section 06114 - Wood Blocking and Curbing: Wood blocking for support of wall-mounted equipment.

1.3 REFERENCES
A. Unless noted otherwise, the most current issue of the reference shall be used.
B. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members.
C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
D. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
E. Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
F. GA-600 - Fire Resistance Design Manual; Gypsum Association.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.5 QUALITY ASSURANCE
A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
B. Applicator Qualifications: Company specializing in performing gypsum board application and finishing, with minimum five years of documented experience.

1.6 REGULATORY REQUIREMENTS
A. Conform to applicable code for fire rated assemblies as indicated on drawings.

PART 2 – PRODUCTS

2.1 METAL FRAMING MATERIALS
A. Metal Framing Manufacturers:
   1. Clark Dietrich Building Systems; www.clarkdietrich.com
   2. Marino-Ware; www.marinoware.com.
   3. Telling Industries; www.buildstrong.com
   4. Substitutions: See Section 01600 - Product Requirements.
B. Metal Framing Connectors and Accessories:
   1. Same manufacturer as framing.

C. Non-Load bearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated unless exceeded herein, with maximum deflection of wall framing of L/240 at 5 psf. All interior framing shall be a minimum of 20 gauge.
   1. Studs: C shaped with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
D. Shaft Wall Studs and Accessories: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 and specified performance requirements.
E. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.
F. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Material: ASTM A 653/A 653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating.

2.2 GYPSUM BOARD MATERIALS

A. Manufacturers:
   1. Georgia Pacific Gypsum Corporation; www.gp.com.
   2. National Gypsum Company; www.nationalgypsum.com.
   3. USG Corporation; www.usg.com.
   4. Lafarge North America Inc.; www.lafargenorthamerica.com
   5. Substitutions: See Section 01600 - Product Requirements.
B. Gypsum Wallboard: ASTM C 36/C 36M and ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut.
   1. Thickness: 5/8 inch.
   2. Edges: Tapered.
C. Type X: Fire resistant, UL or WH rated.
   1. Application: Vertical surfaces, unless otherwise indicated.
      a. Thickness: 5/8 inch.
D. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M and ASTM C 1396/C 1396M; ends square cut.
E. Fiber Reinforced Gypsum Board for Partition Walls: Laminated ply panel with reinforced gypsum core with multiple ply abrasion resistant paper on front, back and long edges
   1. Thickness: 5/8 in.
   2. Width: 4 ft.
   3. Length: maximum available length in place
   4. Edges: ends square cut, beveled edges
   5. Impact Resistance: Board shall show no failure and withstand 17 impacts when tested in accordance with ASTM E 695, modified.
   6. Indentation Resistance: Not less than the following loads to produce the indicated depth of surface indentation when tested in accordance with ASTM D 1037, modified:
      a. 0.100 in.: 232 lbs.
   7. 3M Surface Abrasion Resistance: Not greater than the following depths when tested using the indicated number of cycles in accordance with ASTM D 4977, modified:
      a. 100: 0.000 in.
   8. Taber Surface Abrasion Resistance: Not greater than the following depths when tested using the indicated number of cycles in accordance with ASTM D 4060, modified:
      a. 50: 0.004 in.
   9. Impact/Penetration Resistance Rating: Not less than 36 ft.-lbs. When tested in accordance with ASTM D 2394, modified.

2.3 CEMENTUOUS BACKING PANELS

A. Manufacturers
   1. Custom Building Products; www.custombuildingproducts.com
   2. FinPan, Inc.; www.finpan.com
   3. United States Gypsum Co; www.usg.com
   4. Substitutions: See Section 01600 - Product Requirements.
   5. Cementitious Backer Board for Interior Applications meeting the following requirements:

B. Cementitious Backer Board for interior applications: Meeting or exceeding ASTM C1186 Type A, Grade II aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces, 1/2 inch thick.

C. Cementitious Backer Board for Exterior and cavity Applications meeting the following requirements:
   1. Meeting or exceeding ASTM C1186 Type A, Grade II
   2. Meeting or exceeding ASTM E136 for non-combustability.
   3. High density, glass fiber reinforced both sides.
   4. Thickness: 1/2 inch.
   5. Size: 32 foot x 5 foot
   6. Tape: 2 inch wide, coated glass fiber tape for joints and corners as recommended by the manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

A. Metal Framing: Comply with ASTM C 754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.

C. Studs: Space studs as permitted by standard.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. T intersections: Construct T intersections by using minimum of three studs with top, bottom and intermediate blocking or four full studs. Lock all walls together by fastening framing members together at 16 inches on center vertically. Walls secured through Gypsum materials only shall not be permitted.

E. Corners: Construct corners using minimum of three studs with top, bottom and intermediate blocking or four full studs. Lock all walls together by fastening framing members together at 16 inches on center vertically. Walls secured through Gypsum materials only shall not be permitted.

F. Openings: Install minimum double studs at wall openings, sides, top and bottom at door and window jambs and all other openings.

G. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
   1. Orientation: Vertical.
   2. Spacing: As indicated.

H. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.

I. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.
J. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame openings, toilet accessories, hardware, and other wall mounted items. Comply with Section 06100 for wood blocking.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 GYPSUM BOARD INSTALLATION

A. Comply with ASTM C 840. Install to minimize butt end joints, especially in highly visible locations.
B. Single Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
C. Single Layer Fire-Rated: Install gypsum board vertically, with ends and edges occurring over firm bearing.
D. Cementitious Backing Board: Install over studs in accordance with manufacturer’s instructions.
E. Installation on Metal Framing: Use screws for attachment of all gypsum board.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
B. Corner Beads: Install at external corners, using longest practical length.
C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated on drawings.

3.6 JOINT TREATMENT

A. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840 and as scheduled below.
B. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.7 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.8 FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view.
B. Level 2: Utility areas and areas behind cabinetry.
C. Level 3: Walls scheduled to receive textured wall finish.
D. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.
E. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION

SECTION 09300

TILE

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Tile for wall applications.
B. Cementitious backer board as tile substrate.
C. Ceramic accessories.
D. Ceramic trim.
E. Non-ceramic trim.

1.2 RELATED SECTIONS
A. Section 03505 – Self-Leveling Underlayment
B. Section 07900 – Joint Sealers

1.3 REFERENCES
A. Unless otherwise noted, the most current issue of the Reference shall be used.
B. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
C. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
D. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
E. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar.
F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive.
G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.
I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Mortar and Grout.
J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
L. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units.
M. ANSI A118.1 - American National Standard Specifications for Dry-Set Portland Cement Mortar.
N. ANSI A118.3 – American National Standard Specifications for Chemical Resistent, Water Cleanable Tile-Setting and Grouting Epoxy and Water Cleanable Title-Setting Epoxy Adhesive.
O. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar.
P. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation.
Q. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation.
R. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation.
S. ANSI A118.9 - American National Standard Specifications for Cementitious Backer Units.
T. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.
U. TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of America, Inc.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, and setting details.
D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.
E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.5 QUALITY ASSURANCE

A. Maintain one copy of TCA Handbook and ANSI A108 Series/A118 Series on site.
B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
C. Installer Qualifications: Company specializing in performing tile installation, with minimum five years of documented experience.

1.6 MOCK-UP

A. See Section 01400 - Quality Requirements, for general requirements for mock-up.
B. Construct tile mock-up where indicated on the drawings or as directed by Architect, incorporating all components specified for the location. Size and configuration shall be determined by scope of work.
C. Minimum size of mock-up is indicated on the drawings or as directed by Architect.
D. Approved mock-up may remain as part of the work. Rejected mock-up must be demolished and debris removed from site.

1.7 PRE-INSTALLATION MEETING

A. Convene one week prior to starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesives in an unventilated environment.
B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.10 EXTRA MATERIALS

A. Provide 2% of each size, color and surface finish of tile specified, but not less than one box of each type.

PART 2 – PRODUCTS

2.1 TILE

A. Manufacturers:
   1. Basis of Design – Dal-Tile All products by the same manufacturer.
B. Substitutions: See Spec Section 01600 – Product requirements.

C. ColorBody Porcelain Tile:
   1. Product: Fabrique.
   2. Size and Shapes:
      a. Floors: 12”x24”
      b. Walls: 4”x24”
D. Surface Finish: Unpolished.

E. Color: Crème Linen P686
   1. Trim Units: Matching bullnose, cove base corner, cove base outcorner, jolly, grooved bullnose, cement bullnose, fabric bullnose, shapes in sizes coordinated with field tile.
   2. Metal Trim for transition between floor finishes of different heights.

2.2 TRIM AND ACCESSORIES

A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
B. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
   1. Manufacturer: Same as for tile.

2.3 MORTAR MATERIALS

A. Manufacturers:
   1. Bonsal American; www.bonsal.com
   2. Bostik; www.bostik-us.com
   3. Custom Building Products; www.custombuildingproducts.com
   4. Laticrete; www.laticrete.com
   5. Substitutions: See Section 01600 - Product Requirements.
B. Mortar Bond Coat Materials:
   1. Dry-Set Portland Cement type: ANSI A118.1.
   2. Latex-Portland Cement type: ANSI A118.4.

2.4 GROUT MATERIALS

A. Manufacturers:
   1. Bonsal American; www.bonsal.com
   2. Bostik; www.bostik-us.com
   3. Custom Building Products; www.custombuildingproducts.com
   4. Laticrete; www.laticrete.com
   5. Substitutions: See Section 01600 - Product Requirements.
B. Standard Grout: Polymer modified cement grout, sanded or unsanded, as specified in ANSI A118.7.
   1. Color: To be selected from manufacturer's full line.
C. Silicone Rubber Grout: Silicone sealant, moisture and mildew resistant type, color as selected; use for at all differential plane intersections.

2.5 ACCESSORY MATERIALS

A. Cementitious Backer Board: ANSI A118.9; High density, cementitious, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that wall surfaces are smooth and flat within tolerances specified in Section 09260, are dust-free, and are ready to receive tile.
B. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
C. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Protect surrounding work from damage.
B. Vacuum clean surfaces and damp clean.
C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
D. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

3.3 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
E. Form internal angles square and external angles bullnosed.
F. Install ceramic accessories rigidly in prepared openings.
G. Install non-ceramic trim in accordance with manufacturer's instructions.
H. Install thresholds where indicated.
I. Sound tile after setting. Replace hollow sounding units.
J. Keep expansion and control joints free of adhesive or grout. Apply sealant to joints.
K. Allow tile to set for a minimum of 48 hours prior to grouting.
L. Grout tile joints. Use standard grout unless otherwise indicated.
M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCA Handbook Method W244, using membrane at toilet rooms, kitchens, locker rooms, and showers; and all wet areas.
B. Over interior concrete and masonry install in accordance with TCA Handbook Method W202, thin-set with dry-set or latex-portland cement bond coat.

3.5 CLEANING

A. Clean tile and grout surfaces.

3.6 PROTECTION OF FINISHED WORK

A. Do not permit traffic over finished floor surface for 4 days after installation.

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 09260 – Gypsum Board Assemblies.
B. Division 15 – Air Outlets and Inlets.
C. Division 16 – Lighting, Lighting Systems, and Controls.

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. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
B. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.
C. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
   1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
      a. Flame Spread: 25 or less
      b. Smoke Developed: 50 or less
D. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
E. 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:
   1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
   2. Grid System: Rusting and manufacturer's defects
   3. 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.
B. 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. Basis of Design: USG Interiors, Inc.: www.usg.com
   2. Substitutions: See Section 01600 - Product Requirements.
B. Acoustical Units - General: ASTM E 1264, Class A.
   1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly the suspension system is a part of.
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. Basis of Design: USG Interiors: “Radar Clima Plus #2410”.
   11. Suspension System: Exposed grid.

2.2 SUSPENSION SYSTEMS

A. Manufacturers:
   1. USG Interiors, Inc.: www.usg.com
   2. 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: Grid color to match ceiling tile color.

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. Dividing Wall Panel Clips – match existing.
C. 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.
   2. L-Shaped molding to match color of ceiling tiles.
D. Gasket for Perimeter Moldings: Closed cell rubber sponge tape.
E. 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 09650

RESILIENT FLOORING

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Resilient tile flooring.
B. Resilient base.
C. Rubber wall base.
D. Installation accessories.
E. Subfloor preparation.

1.2 REFERENCES
A. Unless noted otherwise, the most current issue of the reference shall be used.
B. ASTM F 1066 - Standard Specification for Vinyl Composition Floor Tile.
C. FS RR-T-650 - Skid Resistant; Federal Specifications and Standards.

1.3 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.4 DELIVERY, STORAGE, AND PROTECTION
A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.
B. Deliver materials sufficiently in advance of installation to condition materials to room temperature prior to installation.
C. Protect roll materials from damage by storing on end.

1.5 QUALITY ASSURANCE
A. Manufacturer: Provide resilient flooring manufactured by a firm with a minimum of 10 years experience in the fabrication of resilient flooring of types equivalent to those specified. Manufacturers proposed for use, which are not named in this Section, shall submit evidence of ability to meet performance requirements specified not less than 10 days prior to bid date.
B. Color Matching: Provide resilient flooring products, including wall base and accessories, from one manufacturer to ensure color matching.
C. Manufacturer capable of providing field service representation.
D. Installer's Qualifications: Installer experienced (minimum of 2 years) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to the product manufacturer.
E. Materials: For each type of material required for the work of this Section, provide primary materials which are the products of one manufacturer. Provide secondary materials which are acceptable to the manufacturer of the primary materials. Comply with applicable regulations regarding VOC (volatile organic compound) content of adhesives.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Maintain a temperature of 68 degrees F plus or minus 5 degrees F in spaces to receive resilient flooring. Specified temperature shall be maintained at least 48 hours before, during, and 48 hours after installation.

1.7 WARRANTY

A. Provide manufacturer's standard one-year warranty against defects in manufacturing and workmanship of resilient flooring products. Provide manufacturer's standard limited wear warranty/conductivity warranty as specified under each product as applicable.

1.8 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.
B. Provide 100 sq ft of flooring, 60 lineal feet of base of each type and color specified.

PART 2 – PRODUCTS

2.1 MATERIALS - VINYL COMPOSITION TILE FLOORING (ALTERNATE No. 4 & 5)

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com
   2. Mannington Mills, Inc: www.mannington.com
   3. Tarkett Commercial Brands: www. tarkett.com
   4. Substitutions: See Section 01600 - Product Requirements.
B. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
   1. Minimum Requirements: Comply with ASTM F 1066, of Class corresponding to type specified.
   2. Size: 12 x 12 inch.
   3. Thickness: 0.125 inch.
C. Colors and Patterns: As selected by Architect from full range of industry colors.
   1. **Color 1**
   2. **Color 2**

2.2 MATERIALS – LUXURY VINYL TILE

A. Manufacturers:
   1. Basis of Design: Interface
   2. Shaw
   3. Tarkett
   2. Substitutions: See Section 01600 - Product Requirements.
B. Luxury Vinyl Tile:
   1. Size: 25cm x 1m
   2. Thickness: 4.5mm
C. Basis of Design Colors and Patterns:
   1. LVT-1: Interface, Studio Set #A007, Color A00702 Pewter
   2. LVT-2: Interface, Studio Set #A007, Color A00703 Pepper
D. Installation Method: Ashlar (In direction and pattern as shown on finish drawings).

2.3 MATERIALS – BASE

A. Manufacturers:
   1. Johnsonite, Inc. (Basis of Design); www.johnsonite.com
   2. Armstrong World Industries, Inc.; www.armstrong.com
   3. Flexco Floors; www.flexcofloors.com
   4. Burke Flooring; www.burkeflooring.com
   5. Roppe Corp.; www.roppe.com
   6. Nora; www.norarubber.com
   7. Substitutions: See Section 01600 - Product Requirements.

B. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style A and as follows:
   1. Profile: **Cove**
   2. Height: **4 inch.**
   3. Thickness: 0.125 inch thick
   4. Finish: Satin
   5. Length: Roll
   6. Color: Color as selected from manufacturer's full color range
   7. Accessories: Premolded external corners, internal corners, and end stops

2.4 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
C. Moldings and Edge Strips: As indicated on drawings.
D. Filler for Coved Base: Plastic.
E. Sealer and Wax: Types recommended by flooring manufacturer

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Section 03300 and are ready to receive resilient flooring.
B. Verify that concrete sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
   1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
   2. Alkalinity: pH range of 5-9.
C. Verify that required floor-mounted utilities are in correct location.
D. Perform adhesive bond test in each major area, minimum 1 per 2,000 square feet, prior to installation. Examine after 72 hours to determine whether bond is solid and no moisture is present. Do not proceed with work until results of bond test are acceptable.

3.2 PREPARATION

A. Where tile is shown or scheduled to be installed over existing tile, remove existing tile completely. Sand and level substrate with a latex underlayment acceptable to, or provided by, the tile flooring manufacturer. In addition, comply with the tile flooring manufacturer’s procedures for installation over existing tile.
B. Where only tile patching is required, remove existing tile back to full tile units and match coursing. Clean substrate and comply with tile manufacturers instructions for installation over existing substrate.
C. Comply with ASTM F 710-92 and manufacturer's recommendations for surface preparation. Remove substances incompatible with resilient flooring adhesive by method acceptable to manufacturer.
D. Concrete floors with steel troweled (slick) finish shall be properly roughened up (sanded) to ensure suitable adhesion.
E. Concrete floors with curing, hardening, and breaking compounds shall be abraded with mechanical methods only to remove compounds. Use blastrac or similar equipment.
F. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
G. Fill voids, cracks, and depressions with trowel-applied leveling compounds acceptable to manufacturer. Remove projections and repair other defects to tolerances acceptable to manufacturer.
H. Prohibit traffic until filler is cured.

I. Clean substrate by vacuuming subfloors immediately prior to installation to remove loose particles.
J. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - GENERAL

A. Install resilient flooring in accordance with manufacturer's printed installation instructions.
B. Comply with the following:
   1. Layout resilient flooring to provide equal size at perimeter. Adjust layout as necessary to eliminate resilient flooring which is cut to less than half full width.
   2. Lay resilient flooring with arrows in the same direction.
   3. Install resilient flooring without cracks or voids at seams. Lay seams together without stress. Remove excess adhesive immediately.
   4. Scribe resilient flooring neatly at perimeter and obstructions.
   5. Extend resilient flooring into reveals, closets, and similar openings.
   6. Install reducer strips at exposed edges.
   7. Do not mix manufacturing batches of a color within the same area.
   8. Do not install resilient flooring over building expansion joints.
   9. Do not install defective or damaged resilient flooring.

3.4 INSTALLATION - TILE FLOORING

A. Install in accordance with manufacturer's instructions.
B. Mix tile from container to ensure shade variations are consistent when tile is placed.
C. Spread only enough adhesive to permit installation of materials before initial set.
D. Set flooring in place; press with heavy roller to attain full adhesion.
E. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Secure metal strips (or type as indicated on drawings) before installation of flooring with stainless steel screws.
G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.5 INSTALLATION - BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.6 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

3.7 PROTECTION OF FINISHED WORK

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09685

CARPET TILE

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Carpet tile, trowelable adhesives.
B. Carpet tile, non-trowelable adhesives.

1.2 REFERENCES
A. Unless noted otherwise, the most current issue of the Reference shall be used.
B. ASTM D 2859 – Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering materials.
C. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
D. ASTM E 648 – Standard test Methods for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
E. CRI 104 - Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute.
F. CRI (GLA) – Green Label testing Program – Approved Adhesive Products; www.carpet-rug.com.
G. CRI (GLC) – Green Label Testing Program – Approved Product Categories for Carpet; www.carpet-rug.com.
H. CRI (GLP) – Green Label Plus Carpet Testing Program – Approved Products; www.carpet-rug.org.
I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association.

1.3 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and tile color locations.
C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected by Architect.
E. Manufacturer’s Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention
F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
G. For initial selection of colors and patterns, submit samples in form of actual sections of carpet tile including accessories, showing full range of colors and patterns available, for each type of carpet tile required.
H. Submit manufacturer’s certified test results to show that carpet meets or exceeds product performance specification criteria for carpet testing requirements (i.e. see section 2.3 flame, smoke, Aachen test, etc).

1.4 QUALITY ASSURANCE
A. Manufacturer’s Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
B. Installers shall have documented five year's experience as an Installer of at least 10 projects of similar size and complexity to this project. Workmen shall be experienced and skilled craftsmen.
C. Source Quality Control: Prior to carpet tiles being shipped to project, ensure that manufacturer has tested all carpet and provided written certification that all carpet construction meets or exceeds each minimum of the project specifications.

1.5 ENVIRONMENTAL REQUIREMENTS
A. Store materials in area of installation for minimum period of 24 hours prior to installation.

1.6 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.
B. Provide ten (10) carpet tiles of each color and pattern selected.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Deliver carpeting materials in sealed cartons for carpet tile and sealed containers for related materials. Deliver, store and handle all materials in a manner to prevent damage to materials and previous construction. Store in a safe, dry location, out of the way of other construction as directed. Material must be stored at least 68 degree F. (20 degree C.) for 3 days prior to installation.

1.8 WARRANTY

A. Manufacturer's Warranty:
   1. Provide warranties by Carpet Manufacturer agreeing to replace defective materials during one (1) year warranty period following substantial completion. Also submit the following agreed upon warranties (chair pads not required):
   2. Wear - Surface fiber wear shall not be more than 10% by weight in 15 years.
   3. Static - Carpet will remain static generation at less than 3.0 kV at 70º F, and 20% R.H. for a period no less than 15 years.
   4. No edge ravel, backing separation for a period no less than 15 years
   5. No Dimensional Instability, i.e. shrinkage, stretching, curling and doming which adversely affect the ability of the tile to lay flat for a period no less than 15 years. See Aachen Test.
   6. Antimicrobial preservation properties warranted to be ≥ 90% effective for a period no less than 15 years.
B. Installing contractor shall rework any defective carpet handling or installation workmanship during one (1) year warranty period following substantial completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design:
   1. Tandus Centiva; www.tandus-centiva.com.
B. Or Equal from Acceptable Manufacturers:
   1. Interface; interface.com
   2. Mohawk Group; www.mohawkgroup.com.
   3. Shaw Contract; www.shawcontract.com
   4. Substitutions: See Section 01600 - Product Requirements.
C. Products indicated are provided by specified manufacturer. All acceptable manufacturers shall provide products equal in color range, pattern range, performance data, and style to those specified and shall meet or exceed all minimum specifications listed.

2.2 MATERIALS

A. Basis of Design Carpet Tile: Interface - Product must meet or exceed all of the following minimum specifications:

B. **(CPT-1)** Basis of Design Carpet Tile: Tandus Centiva. Product must meet or exceed all of the following minimum specifications:
   1. Pattern/Color: Assertive Action #04837, Forge #26213 with ER3 backing, or approved equal.
   2. Installation Method: Ashlar.
   3. Tile Size: 24” x 24” tile module.
   4. Yarn System: TDX Nylon.
   5. Gauge: 1/10.
   6. Finish Pile Height: .187 inches avg.
   7. Face yarn weight: 29 oz/ sq yd.

8. Total Recycled Content: 49.3%.
9. CRI Green Label Plus: GLP1366.
10. ISO Requirements: Product must be produced by manufacturer that is ISO 9001 and ISO 14001 certified.

C. **CPT 2 (field at Bailly):**
1. Field Pattern/Color: AE311, Collection: Aerial, Style#: 138830AK00, Color: 104673 Iron or approved equal.
2. Installation Method: **Ashlar**
3. Tile Size: 25cm x 1m
4. Yarn System: 100% recycled Content Type 6 Nylon
5. Construction: Tufted Textured Loop
6. Color System: 100% Solution Dyed
7. Finish Pile Height: 0.1 inches.
8. Pile Density: 5,567
9. Backing: GlasBac Tile
10. Soil Release / Stain Protection: Protekt
11. Lifetime Anti-Microbial: Intercept
12. Total Recycled Content: 76%
13. CRI Green Label Plus: #GLP0820
14. ISO Requirements: Product must be produced by manufacturer that is ISO 9001 and ISO 14001 certified.

D. **CPT 3 (accent at Bailly):**
1. Field Pattern/Color: AE311, Collection: Viva Colores Style#: 101153, Color: Cereza or approved equal.
2. Installation Method: **Ashlar**
3. Tile Size: 50cm x50cm
4. Yarn System: 100% recycled Content Type 6 Nylon
5. Construction: Tufted Textured Loop
6. Color System: 100% Solution Dyed
7. Finish Pile Height: 0.15 inches.
8. Pile Density: 6,416
9. Backing: GlasBac Tile
10. Soil Release / Stain Protection: Protekt
11. Lifetime Anti-Microbial: Intercept
12. Total Recycled Content: 82%
13. CRI Green Label Plus: #GLP0820
14. ISO Requirements: Product must be produced by manufacturer that is ISO 9001 and ISO 14001 certified.

2.3 REGULATORY REQUIREMENTS

A. Proposed flooring must meet CRI Green Label Plus, State of Washington Protocol Environmental Safety Test, and GSA Antimicrobial Certification.
B. Flammability Test Requirements:

Carpet Flammability	
1. Pill Test (ASTM D2859 or CPSC FF-1-70)	Passes
2. Radiant Panel Test (ASTM E648)	$\geq$ 0.45 watts/cm^2, Class 1
Smoke Density (ASTM E662)	$\leq$ 450 Flaming Mode
Dimensional Stability (Aachen Method Din 54318)	$\leq$ 0.1% change
Static Generation at 70º F (AATCC 134 w/ neolite)	$\leq$ 2.5 kV at 20% R.H.
Lightfastness (AATCC 16E)	4.0 after 60 hours
Crocking (AATCC 165)	4.0 wet, dry
Cold Water Bleed (AATCC 107)	4.0
Gas Fade (AATCC 23)	4.0
Ozone Fade (AATCC 109)	4.0
Antimicrobial (AATCC 174, Part II)	$\geq$ 95.0% reduction
Fungicidal (AATCC 174, Part III)	No growth
Soil/Stain Protection (AATCC 175-1991)	$\geq$ 8.0 on the Red 40 Stain Scale

2.4 TRIM AND ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
B. Trowelable Adhesive Installation: Waterproof type recommended and approved by respective carpet manufacturer for use with their materials under site installation conditions. Low VOC adhesives required.
C. Edge Finishing: Provide rubber reducer/transition strip at all exposed edges. Color to be selected by Architect from manufacturer's full range.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor and wall surfaces are smooth and flat within manufacturer's tolerances and are ready to receive carpet tile.
B. Verify that sub-floor and wall surfaces are dust-free, and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
C. Verify that concrete sub-floor surfaces are ready for carpet tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by carpet tile manufacturer and adhesive materials manufacturer.
    1. Repeat tests until results indicate conditions are within manufacturer's tolerances.
D. Verify locations of existing floor-mounted utilities.
E. Thoroughly inspect all sub-floors before commencement work. Notify Owner in writing immediately of all conditions which will prevent producing satisfactory work.
F. Repair floor defects and irregularities prior to installation.
G. Installation of materials constitutes Contractor's acceptance of previous construction and his assumption of responsibility for all unacceptable finished work caused by previous conditions

3.2 PREPARATION

A. Before starting installation remove all paint, sealers or wax from sub-floor by sanding and scraping.
B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
D. Vacuum clean substrate.

3.3 INSTALLATION

A. Install carpet tile in accordance with manufacturer's instructions and CRI 104.
B. Blend carpet from different cartons to ensure minimal variation in color match.
C. Install tiles such that seams are not obvious in the finish work.
D. Provide an installation free of visual imperfections, adhesives, seam cement smears and other foreign matter.
E. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
F. Set parallel to building lines, and center pattern within space.
G. Locate change of color or pattern between rooms under door centerline.
H. Fully adhere carpet tile to substrate.
I. Trim carpet tile neatly at walls and around interruptions.
J. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

A. Upon completion of work thoroughly inspect entire installation. Remove all defective work and replace with perfect materials.
B. Cut off and trim all loose threads. Remove all visible adhesives, seam cement and scraps. Clean all carpet with an upright beater bar type vacuum cleaner.
C. Remove all rubbish, debris, containers and all excess materials not selected by Owner for its retention and legally dispose of off the Owner's premises.
D. Repair all damage to the Owner's property resulting from carpet work. Clean, repair or replace all damage as directed.
E. Clean and vacuum carpet surfaces. Leave premises in clean, accepted condition.

3.5 PROTECTION OF FINISHED WORK

A. Provide and maintain proper protection of finished carpet areas. Do not stack carpet tile cartons higher than is recommended by manufacturer.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Surface preparation.
B. Field application of paints, stains, varnishes, and other coatings.
C. See Schedule - Surfaces to be Finished, at end of Section.

1.2 REFERENCES
A. Unless noted otherwise, the most current issue of the reference shall be used.
B. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

1.3 DEFINITIONS
A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.4 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Samples: Submit two paper chip samples, 4 x 4 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

1.5 QUALITY ASSURANCE
A. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.6 REGULATORY REQUIREMENTS
A. Comply with applicable code for flame and smoke rating requirements for products and finishes.

1.7 MOCK-UP
A. See Section 01400 - Quality Requirements, for general requirements for mock-up.
B. Provide 8’ x 8’ panel as directed by Architect, illustrating special coating color, texture and finish.
C. Provide door frame assembly illustrating paint color, texture and finish.
D. Approved mock-up may remain as part of the work. Rejected mock-up must be re-done.

1.8 DELIVERY, STORAGE, AND PROTECTION
A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS
A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

A. See Section 01600 - Product Requirements, for additional provisions.
B. Supply 1 gallon of each color; store where directed.
C. Label each container with color in addition to the manufacturer's label.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Paints:
   1. Glidden Professional; www.gliddenprofessional.com
   2. Benjamin Moore & Co.; www.benjaminmoore.com
   3. PPG Pittsburgh Paints; www.ppg.com
   4. Sherwin-Williams Co; www.sherwin-williams.com
B. Transparent Finishes:
   1. Glidden Professional; www.gliddenprofessional.com
   2. Benjamin Moore & Co.; www.benjaminmoore.com
   3. PPG Pittsburgh Paints; www.ppg.com
   4. Sherwin-Williams Co; www.sherwin-williams.com
C. Stains:
   1. Glidden Professional; www.gliddenprofessional.com
   2. Benjamin Moore & Co.; www.benjaminmoore.com
   3. PPG Pittsburgh Paints; www.ppg.com
   4. Sherwin-Williams Co; www.sherwin-williams.com
D. Primer Sealers:
   1. Glidden Professional; www.gliddenprofessional.com
   2. Benjamin Moore & Co.; www.benjaminmoore.com
   3. PPG Pittsburgh Paints; www.ppg.com
   4. Sherwin-Williams Co; www.sherwin-williams.com
E. Block Fillers:
   1. Glidden Professional; www.gliddenprofessional.com
   2. Benjamin Moore & Co.; www.benjaminmoore.com
   3. PPG Pittsburgh Paints; www.ppg.com
   4. Sherwin-Williams Co; www.sherwin-williams.com
F. Substitutions: See Section 01600 - Product Requirements.

2.2 PAINTS AND COATINGS – GENERAL

A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
   1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
   2. For good flow and brushing properties.
   3. Capable of drying or curing free of streaks or sags.

2.3 PAINT SYSTEMS - EXTERIOR

A. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
      a. Glidden Professional: 4360-XXXX Devguard Low VOC Multi-Purpose Tank & Structural Primer.
      b. Benjamin Moore & Co.: P06 Super Spec HP® Alkyd Metal Primer
      c. Sherwin-Williams Kem Bond HS, B50WZ Series
   2. Semi-gloss: Two coats of alkyd enamel.
      a. Glidden Professional: GP2406-XXXX Fortis 350 Exterior 100 Percent Acrylic Semi-Gloss Finish.
      b. Benjamin Moore & Co.: Moorcraft Super Spec Latex House & Trim #170
      c. Sherwin-Williams A-100 Exterior Coating, A8 Series

B. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
   1. Galvanize primer.
      a. Glidden Professional: Devoe Coatings 4360 Devguard Low VOC Multi-Purpose Tank & Structural Primer.
      b. Benjamin Moore: Super Spec HP® Acrylic Metal Primer P04
      c. Sherwin Williams ProIndustrial ProCryl Metal Primer, B66-310 Series
   2. Gloss: Alkyd enamel.
      a. Glidden Professional: Devoe Coatings 4309 Devguard Rust Preventative Gloss Enamel.
      b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Gloss Enamel #P26
      c. Sherwin-Williams ProIndustrial Industrial Urethane Alkyd Enamel, B54-150 Series
   3. Semi-gloss: Alkyd enamel.
      a. Glidden Professional: Devoe Coatings 4306 Devguard Rust Preventative Semi-Gloss Enamel.
      b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Semi-Gloss #P24
      c. Sherwin-Williams Metalastic DTM Alkyd Enamel, B55 series

2.4 PAINT SYSTEMS – INTERIOR

A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
   1. Latex primer sealer.
      a. Glidden Professional: GP3210 Gripper Interior/Exterior Primer.
      b. Benjamin Moore: Fresh Start All Purpose 100% Acrylic Primer #046
      c. Sherwin-Williams: Problock Latex Primer/Sealer, B51W20
   2. Gloss: Two coats of latex enamel.
      a. Glidden Professional: GP3028 Ultra-Hide 250 Interior Gloss Paint.
      b. Benjamin Moore: Super Spec HP Acrylic Gloss Enamel #P28
      c. Sherwin-Williams: All Surface Enamel Latex Gloss, A41 Series
   3. Semi-gloss: Two coats of latex enamel.
      a. Glidden Professional: GP1416 Ultra-Hide 150 Interior Semi-Gloss Paint.
      b. Benjamin Moore: Super Spec Latex Semi-Gloss Enamel #276
      c. Sherwin-Williams: ProMar 400 Interior Latex Semi-Gloss, B31-4450 Series
   4. Eggshell: Two coats of latex enamel.
      a. Glidden Professional: GP1412 Ultra-Hide 150 Interior Eggshell Paint.
      b. Benjamin Moore: Super Spec Latex Eggshell Enamel #274
      c. Sherwin-Williams: ProMar 400 Interior Latex EgShel, B20-4450 Series
   5. Flat: Latex enamel.
      a. Glidden Professional: GP1210 Ultra-Hide 150 Interior Flat Paint.
      b. Benjamin Moore: Super Spec Latex Flat #275
      c. Sherwin-Williams: ProMar 400 Interior Latex Flat, B30-4450 Series
B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
   1. Filler coat.
   2. One coat of stain; All colors to be selected by Architect from manufacturer's full range-maximum 3 colors.
      a. Glidden Professional: GP1700V WoodPride Water-Based Interior Wood Stain.
      b. Benjamin Moore: Benwood® Interior Wood Finishes Waterborne Stain 205
      c. Sherwin-Williams: WoodClassics 250 Oil Stain, A49 Series
   3. Gloss: Two coats of varnish.
      a. Glidden Professional: GP1808 Woodpride Interior Gloss Water-Based Varnish.
      b. Benjamin Moore & Co.: Benwood Finishes® Polyurethane Finish High Gloss 428
      c. Sherwin Williams WoodClassics WB Polyurethane Gloss, A68V91
   4. Satin: Two coats of varnish.
      a. Glidden Professional: GP1802 Woodpride Interior Satin, Water-Based Varnish.
      b. Benjamin Moore & Co.: Benwood Finishes® Polyurethane Finish Low Lustre C435
      c. Sherwin Williams WoodClassics WB Polyurethane Satin, A68F90

C. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:
   1. Primer.
      a. Glidden Professional: GP3210 Gripper Interior /Exterior Primer
      b. Benjamin Moore: Fresh Start All Purpose 100% Acrylic Primer #046
      c. Sherwin-Williams: Problock Latex Primer/Sealer, B51W20
   2. Semi-gloss: Latex enamel.
      a. Glidden Professional: GP1416 Ultra-Hide 150 Interior Semi-Gloss Paint
      b. Benjamin Moore: Super Spec Latex Semi-Gloss Enamel #276
      c. Sherwin-Williams: ProMar 400 Interior Latex Semi-Gloss, B31-4450 Series
   3. Flat: Latex enamel.
      a. Glidden Professional: GP1210 Ultra-Hide 150 Interior Flat Paint
      b. Benjamin Moore: Super Spec Latex Flat #275
      c. Sherwin-Williams: ProMar 400 Interior Latex Flat, B30-4450 Series

D. Paint MI-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
      a. Glidden Professional: Devoe Coatings 4360 Devguard Low VOC Multi-Purpose Tank & Structural Prime.
      b. Benjamin Moore: P06 Super Spec HP® Alkyd Metal Primer
      c. Sherwin-Williams: Kem Bond HS Metal Primer, B50WZ Series
   2. Gloss: Two coats of alkyd enamel.
      a. Glidden Professional: Devoe Coatings 4309 Devguard Rust Preventative Gloss Enamel.
      b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Gloss Enamel #P26
      c. Sherwin-Williams: ProIndustrial Industrial Urethane Alkyd Enamel, B54-150 Series
   3. Semi-gloss: Two coats of alkyd enamel.
      a. Glidden Professional: Devoe Coatings 4306 Devguard Rust Preventative Semi-Gloss Enamel.
      b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Semi-Gloss #P24
      c. Sherwin-Williams: Metalastic DTM Alkyd Enamel, B55 Series

E. Paint MI-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with alkyd primer.
      a. Glidden Professional: Devoe Coatings 4360 Devguard Low VOC Multi-Purpose Tank & Structural Primer.
      b. Benjamin Moore: P06 Super Spec HP® Alkyd Metal Primer
      c. Sherwin-Williams: Kem Bond HS Metal Primer, B50WZ Series
   2. Gloss: Two coats of alkyd enamel.
      a. Glidden Professional: Devoe Coatings 4309 Devguard Rust Preventative Gloss Enamel.
      b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Gloss Enamel #26
      c. Sherwin-Williams: ProIndustrial Industrial Urethane Alkyd Enamel, B54-150 Series
   3. Semi-gloss: Two coats of alkyd enamel.
      a. Glidden Professional: Devoe Coatings 4306 Devguard Rust Preventative Semi-Gloss Enamel.
      b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Semi-Gloss #P24
      c. Sherwin-Williams: Metalastic DTM Alkyd Enamel, B55 Series

F. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
   1. One coat of fast-drying latex primer sealer.
      a. Glidden Professional: 1000 High-Hiding Interior Primer.
      b. Benjamin Moore: Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer #253
      c. Sherwin-Williams: ProMar 400 Interior Latex Primer, B28W8400
   2. Semi-gloss: Latex enamel.
      a. Glidden Professional: GP1416 Ultra-Hide 150 Interior Semi-Gloss Paint.
      b. Benjamin Moore: Super Spec Latex Eggshell Enamel #274
      c. Sherwin-Williams: ProMar 400 Interior Latex Semi-Gloss, B31-4450 Series

3. Eggshell: Latex enamel.
   a. Glidden Professional: GP1412 Ultra-Hide 150 Interior Eggshell Paint.
   b. Benjamin Moore: Super Spec Latex Eggshell Enamel #274
   c. Sherwin-Williams: ProMar 400 Interior Latex EgShel, B20-4450 Series
4. Flat: Latex enamel.
   a. Glidden Professional: GP1210 Ultra-Hide 150 Interior Flat Paint.
   b. Benjamin Moore: Super Spec Latex Flat #275
   c. Sherwin-Williams: ProMar 400 Interior Latex Flat, B30-4450 Series

2.5 ACCESSORY MATERIALS

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
C. Test shop-applied primer for compatibility with subsequent cover materials.
D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Plaster and Gypsum Board: 12 Percent
   2. Masonry, Concrete and Concrete Masonry Unit: 12 Percent
   3. Interior Wood: 15 Percent, measured in accordance with ASTM D 4442.
   4. Concrete Floors: 8 Percent.

3.2 PREPARATION

A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
C. Marks: Seal with shellac those which may bleed through surface finishes.
D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
G. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
H. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
I. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

J. Interior Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
K. Interior Wood Items to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
L. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
M. Metal Doors to be painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.
B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
C. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to MEP Specifications for schedule of color coding of equipment, duct work, piping, and conduit.
B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 CLEANING

A. Collect waste material, which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically noted.
   2. Fire rating labels, equipment serial number and capacity labels.
B. Paint the surfaces described below under Schedule - Paint Systems.
C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
   1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
   2. Paint shop-primed items occurring in finished areas.
   3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
   4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

3.7 SCHEDULE - PAINT SYSTEMS

A. Concrete, Concrete Block, Brick Masonry: Finish all surfaces exposed to view.
   1. Exterior: CE-OP-3A, flat.
   2. Interior: CI-OP-3L, semi-gloss.
B. Gypsum Board: Finish all surfaces exposed to view.
   1. Interior Ceilings and Bulkheads: GI-OP-3L, flat.
   2. Interior Walls: GI-OP-3A, semi-gloss.
C. Wood Doors: WI-TR-VS.
D. Steel Doors and Frames: Finish all surfaces exposed to view; MI-OP-3A, gloss.

E. Steel Fabrications: Finish all surfaces exposed to view.
   1. Exterior: ME-OP-3A, gloss; finish all surfaces, including concealed surfaces, before installation.
   2. Interior: MI-OP-3L, gloss.
F. Shop-Primed Metal Items: Finish all surfaces exposed to view.
   1. Finish the following items:
      a. Exposed surfaces of lintels.
      b. Elevator pit ladders.
      c. Exposed surfaces of steel stairs and railings.
      d. Mechanical equipment.
      e. Electrical equipment.

3.8 SCHEDULE - PAINT COLORS

A. PT-1: Field Color
B. PT-2: Accent 1 Color
C. PT-3: Paint to match door frames
D. Additional colors may be required for miscellaneous patching and painting throughout the project. The Contractor shall verify in-field, and match to existing, adjacent surfaces.

END OF SECTION

SECTION 10523

FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Fire extinguishers.
B. Accessories.

1.2 RELATED SECTIONS
A. Section 04810 – Unit Masonry Assemblies
B. Section 06114 – Wood Blocking and Curbing: Wood blocking and shims.

1.3 REFERENCES
A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2002.
B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.4 PERFORMANCE REQUIREMENTS
A. Comply with NFPA 10.
B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.5 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements and location.
C. Product Data: Provide extinguisher operational features, color and finish and anchorage details.
D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 – PRODUCTS

2.1 FIRE EXTINGUISHERS
A. Dry Chemical Type (Ammonium Phosphate): Stainless steel tank, with pressure gauge.
   1. Class 4A-60B:C.
   2. Size 10.
   3. Finish: Baked enamel, color as selected.

2.2 ACCESSORIES
A. Extinguisher Brackets: Formed steel, chrome-plated.
B. Signage: "Fire Extinguisher" mounted on the wall above

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Secure rigidly in place.
C. Place extinguishers and accessories.

END OF SECTION

SECTION 10800

TOILET ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Accessories for toilet rooms.
B. Grab bars.

1.2 REFERENCES
A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2000.
B. ASTM C 1036 - Standard Specification for Flat Glass; 2001.
C. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

1.3 SUBMITTALS
A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

1.4 COORDINATION
A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
A. Toilet Accessories:
   1. A and J Washroom Accessories, New Windsor, NY 12553
   2. American Dryer, Livonia, MI. 48150.
   3. American Specialties, Inc., Yonkers, NY 10701
   4. Bradley Corp., Menominee Falls, WI 53052
   5. Excel Dryer, Inc., East Longmeadow, MA 01028.
   6. McKinney Parker, Essex Industries, Scranton, PA 18505
   7. World Dryer, Berkeley, IL 60163
   8. Substitutions: Section 01600 - Product Requirements.
B. All items of each type to be made by the same manufacturer.

2.2 MATERIALS
A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
B. Keys: Provide 3 keys for each accessory to Owner; master key all lockable accessories.
C. Stainless Steel Sheet: ASTM A 666, Type 304.
D. Mirror Glass: Float glass, ASTM C 1036 Type I, Class 1, Quality Q2, with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with GSA CID A-A-3002.
E. Fasteners, Screws and Bolts: Hot dipped galvanized, tamper-proof, security type.

2.3 FINISHES
A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

2.4 TOILET ROOM ACCESSORIES

A. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
   1. Size: As indicated on Drawings
   2. Frame: 0.5 inch angle shapes, with mitered and welded and ground corners, and tamper-proof hanging system; No. 4 finish.
   3. Backing: Full-mirrored sized, minimum 0.03 inch galvanized steel sheet and non-absorptive filler material.
   4. Product:
      a. ADA Mirror: 0535 manufactured by American Specialties
      b. Mirror: 0600 manufactured by American Specialties

B. Grab Bars: Stainless steel, 1-1/4 inches outside diameter, minimum 0.05 inch wall thickness, non-slip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
   1. Length and Configuration: As indicated on Drawings
   2. Product: Open

C. Toilet Tissue Dispensers (provided and installed by Owner).

D. Paper Towel Dispenser (provided and installed by Owner).

E. Liquid Soap Dispenser (provided and installed by Owner).

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations, as indicated on drawings, and as follows:

END OF SECTION

SECTION 12216

CUBICAL CURTAIN TRACK AND CURTAIN

PART 1 – GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Heavy duty wall, aluminum I-beam system, cubicle curtain track.

1.2 RELATED SECTIONS
A. Section 06100 - Rough Carpentry: Blocking and backing for attachment of cubicle track as deemed necessary to support the curtain.
B. Section 09260 - Supports for Plaster and Gypsum Board: Blocking and backing for attachment of cubicle track to metal substrate as deemed necessary.

1.3 SUBMITTALS
A. Product Data: Submit manufacturer's product data for each type cubicle track provided under this Section. Include construction details, dimensions of each cubicle track, and description of each component.
B. Shop Drawings: If required, provide shop drawings, prepared after field measurements are taken, showing location and extent of cubicle tracks. Provide elevations, sections, and details. Show bracket sizes for each condition. Show size and location of blocking and backing required for installation of cubicle tracks. Show mounting details and method of attachment of cubicle track brackets to backing.
C. Schedule: Provide schedule of cubicle tracks. Use the same designations as indicated on drawings.
D. Samples:
   1. Track Material: Not less than 8 inches long, with specified finish applied. If required, illustrate complete range of colors available for selection.
E. Installation Instructions: Submit complete manufacturer's installation instructions.
F. Qualification Data: If required, submit a letter indicating that installer is authorized by the manufacturer to install specified product.
G. Installer's Experience Record: Submit a list of at least five 5 installations that have been installed for a minimum of 3 years of cubicle tracks similar in size, type and scope as described in this document. Include contact names and phone numbers.
H. Maintenance Data: Submit manufacturer's recommended cleaning and maintenance data as specified in Section 01780. Include maintenance procedures and recommended maintenance materials. Include precautions about cleaning materials that could damage or discolor the cubicle tracks.

1.4 QUALITY ASSURANCE
A. Manufacturer Qualifications: Firm specializing in manufacturing window treatments with at least 10 years' experience.
B. Installers shall be specially trained in the installation of cubicle tracks. Installers shall have completed at least 5 commercial installations of cubicle tracks similar to those specified in this Section.

1.5 SUBSTITUTIONS
A. Substitutions: As equal product by other manufacturers that satisfy the full requirements of the specifications and drawings are permitted. Refer to section 01600 product requirements.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Delivery: Deliver materials in manufacturer's unopened packages, labeled to show manufacturer's name and product name.
B. Storage:
   1. Store materials in a clean area, free of corrosive fumes, dust, and away from construction activities.

2. Stack cubicle tracks horizontally using plastic or wood shims such that drainage and ventilation are provided for, and such that water cannot accumulate in, about or upon containers.
3. Cover stacks with tarpaulins or plastic such that ventilation is provided for, and such that contaminants are prevented from contacting surfaces.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install cubicle tracks until construction and wet and dirty finish work in spaces, including painting, is complete. Air conditioning system shall be operating, and ambient temperature shall be between 60 degrees F. and 85 degrees F. Relative humidity shall be between 45 percent and 65 percent.
B. Field Measurements: Verify dimensions of adjoining construction by field measurements before fabrication. Allow clearances for operable glazed units' operation hardware.
C. Before Installation Begins of Cubicle tracks
   1. Roof shall watertight, windows and frames installed and glazed, and interior doors hung.
   2. Wet work including concrete, masonry, plaster, stucco, and terrazzo, shall be complete and dry.
   3. Application of gypsum wallboard, joint treatment, taping and sanding shall be complete and dry.
   4. Ceilings, window pockets, electrical, and mechanical work above the product shall be complete.
   5. Flooring materials such as carpet, tile, etc. shall be completed.
D. Electrical power (110 volt AC) shall be available for installer's tools within 500 feet of product installation areas.

1.8 WARRANTY

A. Manufacturer's Limited Warranty: Provide manufacturer's 25 year limited warranty against product defects.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURER: BASIS OF DESIGN:

A. Inpro Corporation, S80 W18766 Apollo Drive, Muskego, WI 53150. (800) 222-5556; (262) 679-9010; www.Inprocorp.com
B. Substitutions: Refer to Section 01600 for Product Requirements

2.2 ACCEPTABLE PRODUCT:

A. Basis of Design: Inpro Ultra Cube Cubicle Curtain Track with Gridclips.

2.3 FABRICATION

A. General:
   1. Cubicle tracks shall be free of sharp edges, burrs or other defects.
   2. Size Limitations:
      a. Maximum Width: 288" in a single piece; splices are available for larger lengths
      b. Maximum Height: Not applicable
   3. Prior to fabrication, verify actual opening dimensions by on-site measurement. Calculate cubicle track dimensions to fit within specified tolerances.
B. Track: Aluminum alloy 6063 T52, 0.530" wide at its widest point and 0.934" high at its tallest point. Minimum wall thickness shall not be less than 0.038”. The paint used for the cubicle track shall be Microban® antimicrobial. Standard paints are not acceptable.
   1. Track color shall be painted white.

C. Carrier: Carrier shall have a 13/16" polyacetal plastic body and shall traverse on rolling, self-lubricating, nylon wheels. Each carrier shall be pre-hooked. The carrier shall be designed such that the hook can rotate 360-degrees without breakage. The carrier mechanism shall be engineered so that each carrier is removable and replaceable without removing the track from its brackets, without removing the end cap from the end of the track, and without having to remove the curtain from the track. Each carrier mechanism must also be removable by itself, without having to remove the carrier in front of the one being replaced. Carriers that are not removable via the methods described are not acceptable. The carrier shall include a safety breakaway feature that will release the carrier hook from the carrier body when more than 35 lbs to 40 lbs of pressure is applied.
D. Track End Caps: Shall be an injection molded plastic part secured to the cubicle track with a fixing screw. Available in white or silver.
E. Installation Brackets: Brackets shall be of adequate size to facilitate installation. The brackets shall facilitate easy installation and removal of cubicle track.
F. Provide hospital grade curtain, color as selected by Architect from manufacturer’s standard range.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect substrates and conditions affecting work of this Section. Do not proceed until unsatisfactory conditions have been corrected.
B. Verify that room temperature is a minimum of 65 degrees F. and that painting and other dust-producing operations are complete.

3.2 INSTALLATION

A. Install cubicle tracks in accordance with manufacturer's recommended installation procedures except as otherwise specified herein.
B. Install cubicle tracks with adequate clearance to permit smooth operation of cubicle tracks and any sash operators. Hold cubicle tracks 1/4 inch clear from each side of window opening on inside mount unless other clearance is indicated.
C. Install cubicle tracks so that to allow for proper clearances.
D. Install intermediate support brackets and extension brackets as required.

3.3 CLEANING

A. Clean soiled cubicle track surfaces with a mild soap solution. Do not use steam, hot water, bleach or any abrasive or solvent-based cleaners.
B. To ensure proper drying, provide adequate ventilation for cubicle tracks.

3.4 PROTECTION

A. Protect cubicle tracks as required to assure that they will be without damage at substantial completion.
B. Replace damaged and defective cubicle tracks to satisfaction of Architect.

END OF SECTION

SECTION 15010

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 15, and Division 16.

1.2 SUMMARY

A. This Section includes general administrative and procedural requirements for mechanical installations. The following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 1:
   1. Submittals.
   2. Coordination drawings.
   3. Record documents.
   4. Maintenance manuals.
   5. Rough-ins.
   6. Mechanical installations.
   7. Cutting and patching.

1.3 DEFINITIONS

A. Furnish: To purchase; fabricate, as applicable; and deliver to designated location on job site.
B. Install: To locate and make all necessary connections for complete and operating system. Installing contractor shall provide all necessary labor and miscellaneous piping, fittings, connectors, ductwork, etc. as required for installation and startup. Installing contractor shall also be responsible for all warranties, including the coordination and implementation of all factory warranties, regardless of whether or not the installing contractor has furnished the equipment.
C. Provide: To furnish and install.

1.4 CODES AND STANDARDS

A. Code Compliance: Comply with all applicable codes pertaining to product materials and installations.
B. All product materials and work shall comply to all local codes, including but not limited to the following codes and standards as applicable, in addition to any codes and standards referenced within individual specification sections. These codes and standards shall apply to all Division 15 Sections as applicable.
   1. Americans with Disabilities Act (ADA)
   2. American Gas Association (AGA)
   3. American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)
   4. American Society of Mechanical Engineers (ASME)
   5. Air Moving and Conditioning Associates (AMCA)
   6. American Society for Testing and Materials (ASTM)
   7. American Society of Plumbing Engineers (ASPE)
   8. American National Standard Institute (ANSI)
   9. Air Conditioning and Refrigeration Institute (ARI)
   10. International Building Code
   11. International Mechanical Code
   12. Factory Mutual
   13. Illinois Administrative Code, including, but not limited to:
      a. Illinois State Plumbing Code
      b. Illinois Accessibility Code
   14. National Electric Code (NEC)
   15. National Electric Manufacturers' Association (NEMA)
   16. All applicable sections of National Fire Protection Association (NFPA)
   17. Underwriters' Laboratories (UL)
   18. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

1.5 SUBMITTALS

A. General: Follow the procedures specified in Division 1 Sections, and additional defined below.
B. Increase by one copy the number of mechanical related shop drawings, product data, and samples submitted, as required and defined in Division 2, to allow for required distribution. This copy will be retained by the Consulting Engineer.
C. Additional copies may be required by individual sections of these Specifications.
D. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Deviations included within shop drawings shall not be acceptable unless they are clearly identified as deviations. Deviations from the Contract Documents shall only be acceptable subsequent to the deviation being specifically submitted in writing and responded to by the architect and engineer.

1.6 COORDINATION DRAWINGS

A. Each trade shall prepare original coordination drawings in accordance with Division 1 Sections, other Division 15, and 16 Sections and as additionally defined below. Provide individual drawings for each trade, including (1) reproducible copy. Provide original drawings meeting the requirements as described in this section. Marked up copies of the design documents are not acceptable.
B. Drawings shall include the latest architectural floor plan with column lines identified. These drawings shall detail all elements, components, and systems of the applicable mechanical, plumbing, or fire protection trade. Drawings shall also indicate the locations of other trades and indicate their relationship in all areas where limited space requires detailed coordination. All system components of trade being presented shall appear dark and be easily distinguished from architectural information or other system information included for coordination purposes. All information included that is not a part of the system being presented shall be indicated light or half tone. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
    1. Indicate the proposed locations of piping, ductwork, equipment, and materials. Include the following:
        a. Ductwork mains and branches, size and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
        b. Mains and branches of all piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., air separators, strainers, expansion compensators, tanks, etc.). Indicate actual inverts and horizontal locations of underground piping.
        c. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
        d. Clearances for installing and maintaining insulation.
        e. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
        f. Equipment connections and support details.
        g. Fire-rated wall and floor penetrations.
        h. Valve stem movement.
        i. Indicate location of all equipment, ductwork, plumbing fixtures, piping etc., with dimensions from prominent building lines; and elevations above corresponding floors, roofs or grade as applicable.
    2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
    3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
    4. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items. Dimension all items from prominent building lines except for those located in modular type ceilings.

5. Submit all coordination drawings and/or shop drawings prior to purchase, fabrication, or installation of any equipment. Any work started or equipment purchased prior to the review of submitted drawings by the design engineer is done at the contractor's risk. The offending contractor shall be entirely responsible for all changes, modifications, and/or extra services required resulting from the improper coordination and/or improper submittal procedures.
6. Encircle or bubble any revisions made on drawings being submitted more than one time. Indicate all revisions or changes made subsequent to the previous submittal reviewed by the engineer.

C. See front end documents for additional coordination requirements.

1.7 MAINTENANCE MANUALS

A. Prepare maintenance manuals in accordance with Division 1 Sections. In addition to the requirements specified in Division 1, include the following information for equipment items:
   1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
   2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
   3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
   4. Servicing instructions and lubrication charts and schedules.

1.8 WARRANTIES

A. The Contractor shall warrant all Mechanical Work to be free of faults and defects in accordance with the General Conditions and Supplementary Conditions for a minimum period of one (1) year from final acceptance of the work. This shall include all materials and labor. Extended warranties shall be provided as indicated in other sections of these Specifications.
B. The Contractor shall submit signed warranties for installations, equipment and fixtures required by this section and other sections of these Specifications.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
B. Store and protect products under provisions of Division 1 General Requirements.
C. Deliver and store material in shipping containers with labeling in place.
D. Contractor shall store all materials shipped to this site in a protected area. If material is stored outside of the building, it must be stored off the ground a minimum of six inches set on 6 x 6 planks and/or wood pallets. All material must be completely covered with waterproof tarps or visqueen. All piping will have the ends closed to keep out dirt and other debris. No equipment will be allowed to be stored on the site unless it is sitting on wood planks and is completely protected with weatherproof covers.

PART 2 - PART 2 – PRODUCTS

2.1 MANUFACTURERS

(Not Applicable)

PART 3 - PART 3 – EXAMINATION

3.1 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
B. Refer to equipment specifications in Divisions 2 through 17 for additional rough-in requirements.

3.2 MECHANICAL INSTALLATIONS

A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate mechanical systems, equipment, and materials installation with other building components.
2. Verify all dimensions by field measurements.
3. Confirm and arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components.
10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location and purge all extended hoses with grease. Use extreme pressure grease to match District standards.
11. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Division 15 Section - Ductwork Accessories.
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the systems in a diagrammatic form only. Location and arrangement of pipe, duct, and equipment lay-out shall take into consideration pipe/duct sizing and pressure loss, expansion, pump/fan sizing, and other design considerations. So far as practical, install system as indicated. Refer to individual system specifications for requirements for coordination drawing submittals. Adjust routing and provide all offsets, fittings, etc., as required for coordination with building and all other systems at no additional cost to the owner. All deviations from the design drawings shall be reflected on the shop drawings for review by the architect and engineer before proceeding with fabrication or installation.
14. Where drawings, specifications or notes conflict one another the contractor shall immediately advise the architect of such conflicts. For purposes of bidding and pending written receipt of any direction to the contrary, the contractor shall include in his proposal the more expensive alternate described.

3.3 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 1 Sections. In addition to the requirements specified in Division 1, the following requirements apply:

1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
   1. Uncover Work to provide for installation of ill-timed Work.
   2. Remove and replace defective Work.
   3. Remove and replace Work not conforming to requirements of the Contract Documents.
   4. Remove samples of installed Work as specified for testing.
   5. Upon written instructions from the Architect, uncover and restore Work to provide for Architect/Engineer observation of concealed Work.
C. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
   1. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
D. All piping penetrations to be by contractor including sleeves and patching. Use coring whenever possible through concrete and masonry.
E. Contractor to fire safe and seal all wall penetrations for ductwork, piping, conduits, etc. in new and existing walls or floors.

END OF SECTION

SECTION 15020

MECHANICAL DEMOLITION

PART 1 - GENERAL

1.1 REQUIREMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

A. Contractor shall provide all labor, materials, tools, equipment and services for the complete demolition, removal, and legal disposal of existing abandoned equipment; chillers, cooling towers, air cooled condensing units, refrigerant, piping, boilers, tanks, concrete pads, pumps, ductwork, associated controls, associated structural supports, hangers, rods, supports, anchors, miscellaneous hardware, miscellaneous equipment, removal of appurtenant equipment and materials, and lawfully dispose of all equipment, and materials rendered obsolete off the premises.
   1. Recover and dispose of legally, all refrigerants in equipment being demolished, removed or modified. Prior to the disposal of any refrigerant, give the owner the option of salvaging. Reclaim of refrigerant shall be performed by personnel certified in refrigerant reclaim by the State of Illinois.
   2. Drain down entire piping system, flush and fill.
   3. Disconnect, remove, transport, properly and lawfully dispose of all incidental and miscellaneous materials, hardware, equipment associated with the above items.
   4. Maintain temporary warning signage, barricades, yellow protection tape, warning lights, and other similar items around any areas that create a hazard during the demolition process.
   5. Remove indicated piping including all associated hangers, rods, supports, channels, trapeze and anchors, and patching of existing walls, floors, slabs and ceilings to match existing conditions in all respects.
   6. Remove concrete housekeeping pads for existing, pumps, strainers and miscellaneous equipment scheduled for demolition. Repair floors to match existing conditions, in all respects.
   7. Where disturbed by demolition of mechanical equipment, patch existing walls, ceilings, floor surfaces with materials and workmanship to match existing conditions. Where surfaces are painted and components are removed, walls shall be painted to match existing conditions by this contractor.
   8. Coordinate all demolition with Division 16 contractor for shut down of electrical power. Do not proceed with mechanical demolition until all electrical power has been safely disconnected from equipment to be demolished.
   9. Coordinate with Owner any existing equipment/devices that the Owner wants to salvage.

1.3 REQUIREMENTS

A. Contractor shall provide caution and warning signs at all hazardous areas and at all door entries to construction rooms and areas during the entire construction period per IEPA law and regulations.

1.4 MAINTAIN CONTINUITY OF SERVICE

A. Any downtime time periods shall be at the convenience of the Owner and approved by the Architect. Contractor shall give a minimum of 30 days prior written notice to the Architect in advance of any desired shutdown. Prior written notice shall include a schedule for downtime, work to be performed, complete with detailed drawings indicating all temporary wiring and equipment. All downtime periods shall be on weekends or off hours with exact time period approved in advance in writing by the Architect. Coordinate an overall schedule that is to be submitted and approved by the Architect.
B. An electrician shall be on the premises when any trade is working in close proximity to live equipment or within electric rooms during renovations by any trade.
C. All premium time, overtime, labor, material and equipment costs required to accomplish the above shall be included in the Contractor's bid proposal.

SECTION 15020

MECHANICAL DEMOLITION

1.5 PROTECTION

A. Perform removal of equipment and related components, in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures.
B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations.
   1. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. All possible users shall be instructed in use of fire extinguishers. For each area in which a cutting torch or welding apparatus is used, a designated fire watchman shall be appointed.
   2. Contractor shall notify the Architect in writing of the time and location that cutting torches or welding equipment is used. The notice shall be turned in to the Architect prior to commencing work. Due to this being an occupied building, protect adjacent areas from cutting torch flame.
C. Contractor to employ the services of a GPR (ground penetrating radar) specialist prior to major concrete floor saw cutting to assist in the location of underground/poured in concrete utilities and or services.

PART 2 - PRODUCTS

(Not Used.)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Verify existing conditions and locations in field prior to submitting proposal. Failure to do so shall not relieve this contractor from performing the work required under this contract.
B. Remove all piping indicated to be demolished back to associated main, terminating with branch capped as short as possible.
C. All equipment and materials shall be removed from the premises. Materials and equipment become the property of the contractor and shall be legally disposed of.
D. Provide all cutting, coring and patching and fire sealing as required for demolition work.
E. The demolition drawings may be helpful in determining existing conditions, however they are based on original contract drawings and not "AS-BUILT". They do not show modifications made after the original construction.
F. Maintain continuity of all existing systems for all buildings at all times.
G. All demolition of the HVAC system as called for on the demolition drawings shall be under the mechanical (HVAC) contractors work.
H. Mechanical contractor shall visit the building, before submitting his bid, to verify the existing conditions which will affect his work.
I. Before starting any demolition on HVAC equipment which has an electrical connection. The mechanical contractor shall meet with the electrical contractor to identify all such equipment. The electrical contractor will disconnect the power to each unit, remove conduit, wiring, disconnect switches, and starters under his contract. Mechanical contractor will remove all equipment, electrical temperature control wiring, disconnect switches and starters under his contract. Mechanical contractor will remove all equipment, electrical temperature control wiring and conduit under this contract.
J. Mechanical contractor shall verify size of all existing openings, doors, etc. for getting equipment and material out of building. Mechanical contractor shall provide any new or enlarged openings in existing building construction required to facilitate exiting of his equipment/material and restore such openings to their original state after completion.

K. Mechanical contractor shall be responsible for his own clean-up throughout the course of the demolition work.
L. All equipment, material, etc. that is being demolished will become the property of the mechanical contractor. All such items will be removed from the building site by the mechanical contractor. No item which is being removed under the demolition contract may be reused under the new work contract.
M. Sequence of all demolition work shall be in strict accordance with the specifications, drawings and/or as directed by Engineer.
N. The contractor performing the demolition work shall remove no more than 8” of building material around each device being demolished.
O. Remove all abandoned ductwork not being reused under the new construction. Field verify all conditions.

3.2 FLOOR AND WALL OPENINGS

A. Openings through floors and walls where piping, ductwork or equipment has been removed shall be sealed to maintain any fire ratings and to seal off cold, smoke and toxic fumes.

3.3 DAMAGE TO OTHER WORK

A. The Contractor shall be held responsible for any damage caused to existing installations not pertinent to the Contract. The cost of repairs to such damaged work shall be charged against the Contractor.

3.4 CLEAN-UP

A. On completion of work of this section and after removal of all debris, site shall be left in clean condition satisfactory to the Architect. Clean up shall include off the premises disposal of all items and materials not required to remain the property of the Contractor as well as all debris and rubbish resulting from demolition operations.
B. Debris, including brick, asphalt, concrete, stone, and similar materials shall become property of Contractor and shall be disposed of by the Contractor, off the property. Remove concrete foundations, conduits, anchor bolts, and all appurtenances.

END OF SECTION

SECTION 15140

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 WORK INCLUDED
A. Equipment hangers and supports.
B. Sleeves and seals.
C. Flashing.

1.2 RELATED SECTIONS
A. Section 15890 – Ductwork.

1.3 REFERENCES
A. American Society of Mechanical Engineers:
   1. ASME B31.1 – Power Piping.
   2. ASME B31.9 – Building Services Piping.
B. ASTM International:
   1. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
   2. ASTM E814 – Standard Test Method for Fire Tests of Through Penetration Fire Stops.
   3. ASTM F708 – Standard Practice for Design and Installation of Rigid Pipe Hangers.
   4. ASTM E1966 – Standard Test Method for Fire-Resistive Joint Systems.
C. American Welding Society:
   1. AWS D1.1 – Structural Welding Code – Steel.
D. FM Global:
   1. FM – Approved Guide, A Guide to Equipment, Materials & Services Approved by Factory Mutual Research for Property Conservation.
E. Underwriters Laboratories, Inc.
   1. UL 263 – Fire Tests of Building Construction and Materials.
   2. UL 723 – Tests for Surface Building Characteristics of Building Materials.
   3. UL 1479 – Fire Tests of Through-Penetration Firestops.
   4. UL 2079 – Tests for Fire Resistance of Building Joint Systems.
   5. UL – Fire Resistance Directory.

1.4 DEFINITIONS
A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.5 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
C. Product Data: Provide manufacturers catalog data including load capacity.
D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.
E. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.6 REGULATORY REQUIREMENTS
A. Conform to 2015 International Mechanical Code for support of plumbing or hydronic piping.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.2 FLASHING

A. Metal Flashing: 26 gage stainless steel.
B. Metal Counterflashing: 22 gage stainless steel.
C. Lead Flashing:
   1. Waterproofing: 5 lb./sq. ft. sheet lead.
   2. Soundproofing: 1 lb./sq. ft. sheet lead.
D. Flexible Flashing: 47 mil thick sheet compatible with roofing.
E. Caps: Stainless steel, 22-gauge minimum; 16-gauge at fire resistant elements.

2.3 SLEEVES

A. Sleeves for Pipes through Non-Fire Rated Floors: 18 gage galvanized steel.
B. Sleeves for Pipes through Non-Fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage galvanized steel.
C. Sleeves for Pipes through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
D. Sleeves for Round Ductwork: Galvanized steel.
E. Sleeves for Rectangular Ductwork: Galvanized steel.
F. Firestopping Insulation: Glass fiber type, non-combustible.
G. Sealant: Acrylic.

2.4 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12-gauge thick steel. With holes 1½-inches on center.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.2 FLASHING

A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

3.3 SLEEVES

A. Set sleeves in position in wall.
B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
C. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and calk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

END OF SECTION

SECTION 15260

PIPE INSULATION

PART 1 – GENERAL

1.1 WORK INCLUDED
A. All plumbing and hydronic piping jackets and accessories.
B. All piping saddles.

1.2 RELATED SECTIONS
A. Section 15140 - Supports and Anchors: Pipe covering protection shields.
B. Section 15190 - Mechanical Identification.
C. Section 15410 - Plumbing Piping.

1.3 REFERENCES
A. ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
B. ASTM C449 - Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
C. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
D. ASTM C534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
E. ANSI/ASTM C547 - Mineral Fiber Preformed Pipe Insulation.
F. ASTM C585 - Inner and Outer Diameters and Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
G. ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
H. ASTM D1667 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed Cell Foam).
I. ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
J. ASTM E84 - Surface Burning Characteristics of Building Materials.
K. ASTM E96 - Water Vapor Transmission of Materials.

1.4 REGULATORY REQUIREMENTS
A. Conform to 2015 International Mechanical Code and 2015 International Energy Code.

1.5 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Product Data: Provide product description, list of materials and thickness for each service and locations.
C. Submit manufacturer's installation instructions under provisions of Division 1 General Requirements.
D. Contractor shall review all shop drawings prior to submitting them for Architect/Engineer's review. Contractor shall stamp each shop drawing to certify that he has reviewed it. Engineer will not check any shop drawings that Contractor has not stamped with his review certification.

1.6 QUALITY ASSURANCE
A. Materials: Flame spread/fuel contributed/smoke developed rating of 25/50 or less in accordance with ASTM E84. Material shall not melt or drip when exposed to flame.

1.7 QUALIFICATIONS
A. Applicator: Company specializing in performing the work of this Section with minimum five years’ experience.

1.8 DELIVERY, STORAGE AND HANDLING
A. Deliver products to site under provisions of Division 1 General Requirements.
B. Store, protect and handling products under provisions of Division 1 General Requirements.
C. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Insulation Work:
   1. Maintain ambient temperatures and conditions for installation of insulation as required by manufacturers of insulation adhesives, mastics and insulation cements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Insulation:
   1. Manville Corporation.
   2. Knauf Fiberglass.
   3. CertainTeed Corp.
   4. Owens Corning Fiberglass.

B. Steel and Wood Insulation Protection Saddles:
   1. Acceptable Manufacturers:
      a. Grinnell.
      b. B-Line.
      c. Unistrut.

2.2 FIBER GLASS INSULATION MATERIALS (TYPE A):

A. Glass Fiber Insulation
   1. Insulation: ASTM C547; rigid molded, noncombustible.
      a. K Value: 0.23 at 75 degrees F.
      b. Minimum Service Temperature: 0 degrees F.
      c. Maximum Service Temperature: 850 degrees F.
      d. Maximum Moisture Absorption: 0.2 percent by volume.
   2. Vapor Barrier Jacket:
      a. ASTM C921; factory applied vapor retarder composed of a white draft facing out reinforced with glass fiber yarn and bonded to aluminized film (ASJ).
      b. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
      c. Secure with factory applied self-sealing longitudinal laps and butt strips.
      d. Jacket Temperature Limit: Minus 20 to 150 degrees F.
   3. Vapor Barrier Lap Adhesive:
      a. Compatible with insulation.
   4. Fittings (Concealed and Exposed):
      a. Insulate all fittings (plumbing and HVAC) with a minimum of two layers of precut blanket insulation.
      b. Insulation blanket thickness to equal K value of straight sections of insulation.
      c. Tie wire to be 18-gauge stainless steel with twisted ends.
      d. Jacket shall be a one-piece pre-molded high impact fitting 25/50 rated, off-white color, 10 mil thick, brush on welding adhesive connections.
   5. Insulating Cement/Mastic:
      a. Acceptable Manufacturers:
         1) Fibrex.
         2) Pabco.
         3) Manville.
      b. ASTM C195; hydraulic setting on mineral wool.

PART 3 – EXECUTION

3.1 INSULATION

A. Examination:
   1. Verify that piping has been tested before applying insulation materials.
   2. Verify that surfaces are clean, foreign material removed and dry. Flux to be removed from copper piping.

B. Installation:
   1. Install materials in accordance with manufacturer's instructions.
   2. On exposed piping, locate insulation and cover seams in least visible locations.
   3. All insulation to have a vapor barrier jacket (ASJ) with factory applied self-sealing longitudinal laps and butt strips.
   4. Support all piping with insulation protection saddles.
      a. Plumbing Piping:
         1) 2-Inch Pipe Size: Wood dowel with insulation shields.
         2) ¾-Inch and Larger: High density pre-molded type with insulation shields or manufactured wood saddles.
      b. Hydronic Piping:
         1) 2-Inch to 2½-Inch: High density pre-molded type with insulation shields.
         2) 3-Inch and Larger: Manufactured steel saddles welded to the pipe.
   5. Run insulation continuous through walls, floors, sleeves, pipe hangers and other pipe penetrations.
   6. Insulate all piping located behind chases.
   7. Insulate all piping installed inside cabinet unit heaters and fan coils.
   8. **Insulate entire system including fittings, valves, unions, flanges, strainers, expansion joints, pump bodies, chemical feeders, rolairtrols, chemical feed piping from pot feeders and separators, including heating piping.**
   9. Finish all insulation at supports, protrusions and interruptions.
   10. Seal all aluminum jackets outdoors air and water tight.
   11. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.2 INSULATION SCHEDULE

PIPING SYSTEMS	INSULATION TYPE	PIPE SIZES/INSULATION THICKNESS ½" To 1"	1¼" To 2"	2½" To 4"	5" & Larger
A. Plumbing and Mechanical Systems					
Domestic Hot & Cold Water Supply	A	1"	1"	2"	2"
B. Hydronic Water Systems					
Hot Water Supply & Return	A	1"	1"	2"	2"

Note: ALL exposed interior piping shall have a PVC jacket as specified.

END OF SECTION

SECTION 15290

DUCTWORK INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED
A. Ductwork insulation.
B. Duct liner.
C. Insulation jackets.

1.2 RELATED WORK
A. Section 15190 - Mechanical Identification.
B. Section 15890 - Ductwork.

1.3 REFERENCES
A. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
B. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.
C. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
D. ASTM E84 - Surface Burning Characteristics of Building Materials.
E. ASTM E96 - Water Vapor Transmission of Materials.
F. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

1.4 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Product Data: Provide product description, list of materials and thickness for each service and locations.
C. Contractor shall review all shop drawings prior to submitting them for Architect/Engineer's review. Contractor shall stamp each shop drawing to certify that he has reviewed it. Engineer will not check any shop drawings that contractor has not stamped with his review certification.

1.5 REGULATORY REQUIREMENTS
A. Conform to 2012 International Mechanical Code and 2015 International Energy Code with all amendments.

1.6 QUALITY ASSURANCE
A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E84.

1.7 QUALIFICATIONS
A. Applicator: Company specializing in performing the work of this Section with minimum three years’ experience.

1.8 DELIVERY, STORAGE AND HANDLING
A. Deliver, store, protect and handle products to site under provisions of Division 1 General Requirements.
B. Deliver materials to site in original factory packaging, labeled with manufacturer's density and thickness.
C. Contractor shall store all materials shipped to the site in a protected area. If material is stored outside of the building it must be stored off the ground a minimum of 6 inches set on 6 x 6 planks and/or wood pallets. All material must be completely covered with waterproof tarps or visqueen. All ductwork will have the ends closed to keep out dirt and other debris. No equipment will be allowed to be stored on the site unless it is sitting on wood planks and completely protected with weatherproof covers.

1.9 ENVIRONMENTAL REQUIREMENTS
A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics and insulation cements.

PART 2 - PRODUCTS

2.1 GLASS FIBER, FLEXIBLE DUCT WRAP (TYPE A)

A. Acceptable Manufacturers:
   1. Owens Corning Corp. (SOFTR Duct Wrap FRK).
   2. CertainTeed Corp.
   3. Knauf Fiberglass.
   4. Manville.

B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. R Value: ASTM C518, 6.0 at 75 degrees F.
   2. Minimum Service Temperature: 40 degrees F.
   3. Maximum Service Temperature: 250 degrees F.
   4. Maximum Moisture Absorption: 0.20 percent by volume.
   5. Surface Burning Characteristics: ASTM E84 25/50.
   6. Density: 1.0 lb./cu. ft.
   7. Thickness: 2-inches.

C. Vapor Barrier Jacket:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Transmission: ASTM E96; 0.02 perm.
   3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber-based adhesive.

2.2 GLASS FIBER, RIGID DUCT WRAP (TYPE B)

A. Acceptable Manufacturers:
   1. Owens Corning Corp.
   2. CertainTeed Corp.
   3. Knauf Fiberglass.
   4. Manville.

B. Insulation: ASTM C612; rigid, noncombustible board with ASJ facing and ASJ tape.
   1. K Value: ASTM C518, 0.23 at 75 degrees F.
   2. Maximum Service Temperature: 250 degrees F.
   3. Maximum Moisture Absorption: 0.20 percent by volume.
   4. Density: 3.0 lb./cu. ft.
   5. Thickness: 2-inch.

C. Vapor Barrier Jacket:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Transmission: ASTM E96; 0.04 perm.
   3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber-based adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that ductwork has been tested before applying insulation materials.
B. Verify that surfaces are clean, foreign material removed and dry.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.
B. Insulated ductwork conveying air below ambient temperature:
   1. Provide insulation with vapor barrier jackets.
   2. Finish with tape and vapor barrier jacket.

3. Continue insulation through walls, sleeves, hangers and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:
1. Provide with standard vapor barrier jacket.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections and expansion joints.

D. External Duct Insulation Application:
1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket; vapor tight.
2. Install without sag on underside of ductwork. Use adhesive and mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
3. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.3 TOLERANCE

A. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions, as materials indicated.

3.4 GLASS FIBER DUCTWORK INSULATION SCHEDULE

TYPE DUCTWORK	THICKNESS INCHES	TYPE
All low and medium pressure rectangular supply and return ductwork	1”	B
Relief and transfer ducts	2”	B
Outdoor air intake ductwork/plenums	2”	A
All concealed round low and medium pressure rectangular supply and return ducts	2”	A

END OF SECTION

SECTION 15410

PLUMBING PIPING

PART 1 – GENERAL

1.1 SECTION INCLUDED

A. Pipe, pipe fittings, valves, and connections for piping systems.
   1. Sanitary sewer, drainage and vent
   2. Domestic water.
   3. Storm water.

B. Testing, adjusting and balancing of domestic hot and domestic tempered water circulating system. Coordinate with Test and Balancing Contractor.

1.2 RELATED SECTIONS

A. Section 15140 – Supports and Anchors.
B. Section 15260 – Piping Insulation.
C. Section 15430 – Plumbing Specialties.
D. Section 15440 – Plumbing Fixtures.
E. Division 16 Specifications – Equipment Wiring Systems: Electrical characteristics and wiring connections.

1.3 REFERENCES

A. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.
B. ASME B16.3 - Malleable Iron Threaded Fittings.
C. ASME B16.4 - Cast Iron Threaded Fittings Class 125 and 250.
D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
E. ASME B16.22 - Wrought Copper and Bronze Solder Joint Pressure Fittings.
F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.
G. ASME B31.1 - Power Piping.
H. ASME SEC IX - Welding and Brazing Qualifications.
I. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
J. ASTM A74 - Cast Iron Soil Pipe and Fittings.
K. ASTM B32 - Solder Metal.
L. ASTM B88 - Seamless Copper Water Tube.
M. ASTM B306 - Copper Drainage Tube (DWV).
N. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
O. ASTM E814 - Fire Tests of Through-Penetration Fire Stops.
P. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
Q. AWS A5.8 - Brazing Filler Metal.
R. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
S. AWWA C110 - Ductile - Iron and Gray - Iron Fittings 3 in. through 48 in., for Water and Other Liquids.
T. AWWA C111 - Rubber-Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings.
U. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
V. AWWA C651 - Disinfecting Water Mains.
W. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.
X. CISPI 310 - Joints for Hubless Cast Iron Sanitary Systems.
Y. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
Z. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
AA. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
BB. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

CC. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.
DD. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
EE. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
FF. UL 1479 - Fire Tests of Through-Penetration Firestops.
GG. ASTM D-1784-11 – Standard Specifications for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

1.4 SUBMITTALS

A. Submit product data under provisions of Division 1 General Requirements.
B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
C. Contractor shall review all shop drawings prior to submitting them for Architect/Engineer's review. Contractor shall stamp each shop drawing to certify that he has reviewed it. Engineer will not check any shop drawings that contractor has not stamped with his review certification.

1.5 PROJECT RECORD DOCUMENTS

A. Submit project record documents under provision of Division 1 General Requirements.
B. Project Record Documents: Record actual locations of piping, valves, equipment, cleanouts, backflow preventers, drains, wall hydrants, etc.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division 1 General Requirements.
B. Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement parts numbers and availability and location and numbers of service depot.
C. Refer to Part 3. - EXECUTION of this section for Owner training requirements.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with State of Illinois Plumbing Code, 2004. Maintain one copy on site.
   1. Provide reports of inspections by State of Illinois Plumbing inspectors in accordance with Division 1 General Requirements.
B. Valves: Manufacturer's name and pressure rating marked on valve body.
C. Welding Materials and Procedures: Conform to ASME SEC IX and applicable state labor regulations.
D. Welders Certification: In accordance with ASME SEC IX or ANSI/AWS D1.1.
E. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.
F. All products to comply with State of Illinois Plumbing Code requirements.
G. Underwriters Laboratory (UL):
   1. Products listed for 25/50 resistive construction.

1.8 REGULATORY REQUIREMENTS

A. Perform Work in accordance with State of Illinois Plumbing Code, 2014 edition.

1.9 DELIVERY, STORAGE, AND PROTECTION

A. Delivery products to site under provisions of Division 1 General Requirements.
B. Store and protect products under provisions of Division 1 General Requirements.
C. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
D. Provide temporary protective coating on cast iron and steel valves.
E. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
F. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 – PRODUCTS

2.1 SANITARY SEWER AND VENT PIPING, BURIED

A. Cast Iron Pipe: ASTM A74 service weight.
   1. Fittings: Cast iron.
   2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

B. Polyvinyl Chloride (PVC) Pipe: ASTM D2665, schedule 40
   1. Fittings: Schedule 40, PVC to match pipe.
   2. Joints: Solvent weld with colored primer.

2.2 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight.
   1. Fittings: Cast iron.
   2. Joints: ASTM C564, neoprene gasket system or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: Neoprene gaskets and full, heavy-duty stainless-steel clamp assemblies.

C. Steel Pipe: ASTM A53 Schedule 40, galvanized.
   1. Cast Iron Fittings: ASME B16.4, threaded fittings.

D. Polyvinyl Chloride (PVC) Pipe: ASTM D2665, schedule 40 – Cannot be used in plenum ceilings
   1. Fittings: Schedule 40, PVC to match pipe.
   2. Joints: Solvent weld with colored primer.

2.3 SANITARY VENT PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight.
   1. Fittings: Cast iron.
   2. Joints: ASTM C564, neoprene gasket system or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: Neoprene gaskets and fully, heavy-duty stainless-steel clamp assemblies.

C. Steel Pipe: ASTM A53 Schedule 40, galvanized.
   1. Cast Iron Fittings: ASME B16.4, threaded fittings.

D. Polyvinyl Chloride (PVC) Pipe: ASTM D2665, schedule 40 – Cannot be used in plenum ceilings
   1. Fittings: Schedule 40, PVC to match pipe.
   2. Joints: Solvent weld with colored primer.

2.4 WATER PIPING, BELOW GRADE

A. Pipe Sizes Under 3 Inches: NOT ALLOWED.

B. Pipe Sizes 3 Inches & Larger: Ductile Iron Pipe: AWWA C151, Class 52 with AWWA C105 polyethylene encasement.
   1. Fittings: AWWA C110, Class 250 ductile iron, standard thickness.
   2. Joints: AWWA C111, Class 250 mechanical joints (MJ) with rubber gasket, retainer gland, bolts and 3/4 inch diameter rods.

2.5 WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, hard drawn (all sizes).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze. Contractor may utilize mechanically formed tee and coupling connections.
   2. Joints: ASTM B32, solder, Grade 95TA or AWS5.8, B-Cup silver braze for mechanically formed connections.

2.6 STORM WATER PIPING, BURIED

A. Cast Iron Pipe: ASTM A74 service weight.
   1. Fittings: Cast iron.
   2. Joints ASTM C564, neoprene gasket system.
B. Schedule 40 ABS where tying into existing ABS storm piping.

2.7 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 310-2011 hubless.
   1. Fittings: Cast Iron
   2. Joints ASTM C564-2015, neoprene rubber gasket system."

2.8 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 3 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.
B. Pipe Size Over 3 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service; 1/16-inch-thick performed neoprene.
C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.9 BALL VALVES (BV)

A. Up to and Including 2 Inches:
   1. Manufacturers:
      a. Apollo Valve.
      b. Hammond Valve.
      c. Milwaukee Valve.
      d. Nibco Valve.
      e. Stockham.
B. MSS SP-110, 600 psi WOG, bronze, two-piece body, chrome plated ball, full port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle, solder ends.

2.10 BALANCING FITTINGS (BF)

A. Up to and Including 2 Inches:
   1. Manufacturers:
      a. Armstrong Pump Co - Model CBV-I.
      b. Tour/Anderson.
      c. Nibco – Model S-1710.
B. Construction: 150 psi WOG (minimum), wye bodied bronze globe valve with bronze stem and seat calibrated and readable balance fittings with readout ports fitted with integral check valves to prevent loss of fluid when attaching monitoring kit.
C. Calibration: Integral indicating degree of valve opening with positive shut-off and memory stop.

2.11 SWING CHECK VALVES (CK)

A. Up To and Including 2 Inches:
   1. Manufacturers:
      a. Hammond Valve.
      b. Milwaukee Valve.
      c. Nibco Valve.
      d. Stockham.
   2. MSS SP-80, Class 125, bronze body and cap, bronze swing disc with rubber seat, solder ends.

2.12 FIRE AND SMOKE PENETRATION SEALANTS

A. Fire Seal:
   1. Seal penetrations of fire-rated walls, floors or ceilings by raceways for compliance with NEC 300-21.
      a. Acceptable Manufacturers:
         1) Dow Corning: Fire Stop.
         2) Nelson: Flameseal.
         3) T & B: Flameseal.
         4) 3M Co.: Fire Barrier.
         5) Oatey Co: Flame Barrier.
      b. Fill void around raceways.
      c. Sleeves: Heavy wall steel pipe, anchored to building construction and finished plumb with wall, ceiling to floor lines.

B. Thermal Seal:
   1. Seal penetrations of thermally insulated equipment or rooms to prevent heat transfer.
   2. Dual exterior of raceway with fiberglass or other material compatible to equipment or room and approved by Architect/Engineer.
   3. Seal interior of raceway with duct sealing compound at entry to equipment or room.

C. Water Seal:
   1. Seal penetrations of perimeter walls or floors below grade to prevent entry of water; use materials compatible with wall or floor construction and approved by Architect/Engineer.
   2. Seal Penetrations of Room: Sealed with flashings compatible with roof design and approved by roofing system manufacturer and Architect/Engineer.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.
D. Contactor to employ the services of a Ground Penetrating Radar Specialist to perform x-ray of areas requiring saw-cutting, prior to actual saw-cutting.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Provide non-conducting dielectric connections wherever jointing dissimilar metals (i.e. copper to steel/iron pipe.).
C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
E. Group piping whenever practical at common elevations.
F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 15260.
H. Provide access where valves and fittings are not exposed.
I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly. Locate vents 12 - 15 ft. away from air intake assemblies. Piping to extend min. 12" above roof.
J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

K. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
L. Install bell and spigot pipe with bell end upstream.
M. Install valves with stems upright or horizontal, not inverted.
N. Install water piping to ASME B31.9.
O. Slope water piping and arrange to drain at low points. Provide drain valves at low points.
P. Sizing:
    1. Unless otherwise indicated, install all supply piping, including shut-off valves, strainers and accessory fixtures to pumps, fixtures and other equipment at line size with reduction in size being made only at inlet to control valve, fixture or pump.
    2. Install supply piping from outlet of control valve at full size connection to equipment served.
Q. Make reduction in water pipes with eccentric reducing fittings installed to provide drainage and venting.
R. Branch Take-Offs:
    1. Liquids: From top, bottom or side of mains or headers at either 45 degrees or 90 degrees from horizontal plane.
    2. Do not project branch pipes inside main pipe.
S. Pipe Drainage Provision:
    1. Slope water piping 1 inch in 40 feet and arrange to drain at low points.
T. Underground Pipe:
    1. Lay in dry trenches maintained free of accumulated water.
    2. Provide and operate sufficient pumping equipment to maintain excavations, trenches and pits free of water.
    3. Dispose of pumped water so operation areas and other facilities are not flooded.
    4. Pipe laying follows excavating close as possible.
U. Interior Sanitary Soil Waste, Vent:
    1. Connect underground sewers to site utilities at point 5 feet outside building walls or as specifically designated on drawings.
    2. Pitch sewers and branches as follows, unless otherwise indicated on drawings:
        a. Pipe, 3 Inches and smaller: Minimum 1/4 inch per foot.
        b. Pipe, 4 Inches and larger: Minimum 1/8 inch per foot, but no less than 1%.
    3. Continuously bed underground or on-ground piping on minimum 3 inch compacted sand or gravel, with depressions for hubs. Bed PVC pipe only on compacted sand bed; gravel not allowed.
    4. Compact backfilling for 6 inches, sides and tops; and 3 inches under pipe to 95% proctor.
    5. Complete backfilling to existing grade or to elevation indicated on Drawings, compacted to 95% proctor.
V. Contractor to clean and flush all faucet aerators and strainers at final completion of project.
W. Contractor to insulate all cold, hot, tempered, and all recirculation domestic water piping in accordance with Section 15260.

3.4 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.
B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
C. Provide balancing fittings flow controls in hot water recirculating systems where indicated.
D. Provide valve types as designated on drawings without deviation. All valves to be full line size of piping

3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.
B. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
E. Maintain disinfectant in system for 24 hours.
F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.
I. Chlorinate and disinfect to point of new connection. Examine site water valving configuration to determine extent of chlorination. Contact site contractor to verify.
J. Submit reports in accordance with Division 1 General Requirements.

3.6 DOMESTIC HOT WATER RECIRCULATION SYSTEM BALANCING

A. Testing and balancing of domestic hot and domestic tempered water recirculation system provided under separate contract. Refer to Section 17800.

3.7 PIPE TESTING

A. Before final acceptance of piping, test all systems scheduled and prove to be free of leaks.
   1. Perform tests under observation of Construction Manager.
   2. Remove, replace or satisfactorily repair defective work revealed by tests
   3. Make piping repairs with new materials; caulking of screwed joints or pin holes not permitted.
   4. Underground systems tested before backfilling.
   5. Furnish test equipment and material for tests.
   6. Owner furnished water for testing and flushing.
B. Testing Medium:
   1. Hydrostatic Testing Medium: Clean pure water
C. Pressure Testing Gauges: ANSI B40.1, Grade AA; minimum 6-inch diameter dial with scale divisions equal or less than maximum allowable pressure drop.
D. Waste and Vent System Piping:
   1. Test with water and air before fixtures are set.
   2. Water Test:
      a. Apply to drainage and vent system in accordance or in entirety.
      b. When entire system is tested, tightly close all openings in pipes except highest single opening and fill system with water to overflow point.
      c. When system is tested in sections, tightly plug each opening except highest opening, fill each section with water and test each section with minimum 10 foot head of water; test each preceding section until entire system has been tested with minimum 10 foot of water, except uppermost 10 feet of system.
      d. Keep water in system, or in portion under test, for minimum 30 minutes before inspection.
      e. System must be tight at all joints; 1 inch in one hour leakage allowed.
   3. Air Test:
      a. Apply minimum 3 psi with force pump and maintain minimum 1 hour with no leakage apparent.
      b. Use mercury-column gauge in making test.
E. Domestic Water System:
   1. When rough-in is complete and before fixtures are set, test entire hot and cold water piping systems as scheduled and prove tight.
   2. Where portion of water piping system is concealed before completion, test that portion separately as specified for entire system.
F. Testing Requirements:
   1. Hydrostatic tests apply to piping indicated in Schedule in Paragraph G. below.
   2. Raise pressure gradually to given value; then block off source.

3. Allowable Pressure Drop: Maximum amount scheduled during corresponding minimum time interval.
   a. Visually examine all joints during test.
4. Upon successful completion and test approval, relieve piping of pressure, drain, put into normal operation except for potable water to be sterilized before placing in service.

G. Hydrostatic Testing Schedule:

Service	Normal Work Pressure psi	Hydrostatic Test Pressure psig	Maximum Pressure Drop psi	Minimum Time Hours
1. Domestic Water				
Portable Water	To 125	175	2	2

H. Submit test reports and certificates in accordance with Division 1 General Requirements.

END OF SECTION

SECTION 15430

PLUMBING SPECIALTIES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Floor Drains.
B. Floor Cleanouts.
C. Thermostatic mixing valves.
D. Water hammer arrestors and air chambers.

1.2 RELATED SECTIONS
A. Section 15410 - Plumbing Piping.
B. Section 15190 – Mechanical Identification: Product requirements for pipe identification for placement by this section.
C. Section 15450 – Plumbing Equipment.
D. Section 15260 – Pipe Insulation.

1.3 REFERENCES
A. ANSI/ASSE 1017 – Temperature Actuated Mixing Valves.
B. ANSI A112.21.1 – Floor Drains.
C. ANSI A112.26.1 - Water Hammer Arresters.
D. PDI WH-201 Water Hammer Arresters.

1.4 REGULATORY REQUIREMENTS
A. Conform to State of Indiana Plumbing Code.

1.5 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Shop Drawings: Indicate dimensions, weights and placement of openings and holes.
C. Product Data: Provide component sizes, rough-in requirements, service sizes and finishes.
D. Manufacturer's Installation Instructions: Indicate assembly and support requirements.
E. **CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMITTING THEM FOR ARCHITECT/ENGINEER'S REVIEW. CONTRACTOR SHALL STAMP EACH SHOP DRAWING TO CERTIFY THAT HE HAS REVIEWED IT. ENGINEER WILL NOT CHECK ANY SHOP DRAWINGS THAT CONTRACTOR HAS NOT STAMPED WITH HIS REVIEW CERTIFICATION.**

1.6 PROJECT RECORD DOCUMENTS
A. Submit under provisions of Division 1 General Requirements.
B. Record actual locations of equipment, cleanouts, backflow preventers and other devices.

1.7 OPERATION AND MAINTENANCE DATA
A. Submit under provisions of Division 1 General Requirements.
B. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.8 DELIVERY, STORAGE AND HANDLING
A. Deliver, store, protect and handle products to site under provisions of Division 1 General Requirements.
B. Accept specialties on site in original factory packaging. Inspect for damage.

1.9 EXTRA METERIALS
A. Deliver to maintenance department prior to project completion. Submit written verification to Architect/Engineer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURER - PLUMBING SPECIALTIES
A. Josam Co.

B. J.R. Smith.
C. Mifab.
D. Tyler/Wade Co.
E. Watts.
F. Zurn Co.

2.2 ACCEPTABLE MANUFACTURERS – THERMOSTATIC MIXING VALVES

A. Watts.
B. Leonard Valve.
C. Powers.
D. Symmons Industries.
E. Bradley.

2.3 FLOOR DRAINS

A. FD-1: ANSI A112.21.1; lacquered cast iron two-piece body with double drainage flange, 6-inch diameter heavy-duty nickel bronze secured square hole strainer, sediment bucket, vandal resistant fasteners and not flashed; Model 2010-A-6-NB manufactured by J.R. Smith, or equal

2.4 CLEANOUTS

A. Interior Finished Floor Areas (FCO): Lacquered cast iron, two-piece body with double drainage flange, brass gasketed plug and adjustable nickel-bronze round vandal-proof serrated cover in unfinished areas and round with depressed cover to accept floor finish or with carpet markers in carpeted floor area; Model 4021-U manufactured by J.R. Smith, or equal.

2.5 THERMOSTATIC MIXING VALVE (TMV)

A. Provide a thermostatic mixing valve assembly at each lavatory, sink or wash font. Thermostatic mixing valve shall be complete package with lead-free compression fittings on inlets, check valves, strainer with stainless-steel screen, and thermostat to control mix of hot and cold water. Thermostatic mixing valve to be as Model LFUSG-B-M2 as manufactured by Watts; no substitutions. See detail on drawing for piping configuration.

2.6 WATER HAMMER ARRESTORS AND AIR CHAMBERS

A. Fit water supply to each fixture with air chamber; air chamber same size as supply line or ¾-inch minimum and minimum 18-inches long.
B. Provide PDI rated, pre-charged bellows type water hammer arrestors as shown on drawings.

PART 3 – EXECUTION

3.1 PREPARATION

A. Coordinate existing TMV removal and new TMV installation in field with existing piping. Provide new connection kits per TMV Manufactures specific requirements and installation instructions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance cleanout for rodding of drainage system.
C. Encase exterior cleanouts in concrete flush with grade.
D. Coordinate floor cleanout cover types and styles with General Contractor's floor finish schedule.

E. Install each fixture, HVAC make-up water connection, and other devices with air chambers (minimum ¾-inch x 18-inches long) or water hammer arrestor; size in accordance with PDI WH-201 Standards.
F. Install pre-charged water hammer arrestors complete with accessible isolation ball valve.
G. Provide deep seal P-traps for all slab-on grade floor drains.
H. Perform certification of all backflow preventers during substantial completion on accordance with Indiana Plumbing Code.

END OF SECTION

SECTION 15440

PLUMBING FIXTURES

PART 1 – GENERAL

1.1 SECTION INCLUDED
A. Water closets.
B. Lavatories.

1.2 RELATED WORK
A. Section 15140 - Anchors and Supports.
B. Section 15410 - Plumbing Piping.
C. Section 15430 - Plumbing Specialties.

1.3 REFERENCES
A. ANSI A112.6.1 - Supports for Off-the-Floor Plumbing Fixtures for Public Use.
B. ANSI A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
C. ANSI A112.19.2 - Vitreous China Plumbing Fixtures.

1.4 QUALITY ASSURANCE
A. Fixtures: By same manufacturer for each product specified throughout.
B. Trim: By same manufacturer for each product specified throughout.

1.5 SUBMITTALS
A. Submit product data under provisions of Division 1 General Requirements.
B. Include fixtures, sizes, rough-in dimensions, utility sizes, trim and finishes.
C. Contractor shall review all shop drawings prior to submitting them for Architect/Engineer's review. Contractor shall stamp each shop drawing to certify that he has reviewed it. Engineer will not check any shop drawings that Contractor has not stamped with his review certification.

1.6 OPERATION AND MAINTENANCE DATA
A. Submit operation and maintenance data under provision of Division 1 General Requirements.
B. Include fixture trim exploded view and replacement parts lists.

1.7 WARRANTY
A. Provide manufacturer's warranty under provisions of Division 1 General Requirements.

1.8 DELIVERY, STORAGE AND HANDLING
A. Deliver products to site under provisions of Division 1 General Requirements.
B. Store, protect and handle products under provisions of Division 1 General Requirements.
C. Accept specialties on site in original factory packaging. Inspect for damage.

1.9 EXTRA MATERIALS
A. Deliver to maintenance building prior to project completion. Submit written verification to Architect/Engineer.
B. Provide the following quantities of the materials listed:
   1. One (1) faucet repair kit for each faucet type.
   2. One (1) water closet flush valve repair kits; Sloan Valve Co.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - LAVATORIES
A. American Standard Co.
B. Kohler.
C. No Substitutions.

2.2 ACCEPTABLE MANUFACTURERS - FIXTURE TRIM
A. Kohler.
B. No Substitutions.

2.3 ACCEPTABLE MANUFACTURERS – WATER CLOSETS

A. American Standard Co.
B. No Substitutions.

2.4 ACCEPTABLE MANUFACTURERS - FLUSH VALVES

A. Sloan Valve Co.
B. No Substitutions.

2.5 ACCEPTABLE MANUFACTURERS – TOILET SEATS

A. Bemis.
B. No Substitutions.

2.6 ACCEPTABLE MANUFACTURERS - FIXTURE CARRIERS

A. J.R. Smith Mfg. Co.
B. Tyler/Wade Co.
C. Watts.
D. Zurn Co.

2.7 ACCEPTABLE MANUFACTURER - STOPS AND SUPPLIES

A. Brasscraft -- G2 Series or equal.

2.8 WATER CLOSET (WC-1)

A. Bowl: ANSI A112.19.2; wall hung, handicap height, manual lever, siphon jet white vitreous china closet bowl, with elongated rim, 1½-inch spud, china bolt caps; Model AFWALL 2257.101 manufactured by American Standard.
B. Flush Valve: ANSI A112.19.6; exposed chrome plated, diaphragm type water closet flush valve assembly. Valve body, tailpiece and control stop will be in conformance with ASTM alloy classification for se*mi*-red brass. Flush valve assembly to be constructed with dual filtered diaphragm for flush valve accuracy, skirted high back pressure vacuum breaker with bottom hex coupling nut, hand wheel angle checkstop, sweat solder adapter kit, and cast wall flange with set screw; Model Royal 111 SMO-1.28 single flush battery powered exposed sensor Water Closet Flushometer manufactured by Sloan Valve Co.
C. Seat: Anti-microbial solid white plastic, open front, extended, self-sustaining continuous stainless-steel hinge, brass bolts, without cover. Bemis seat model 2155-CT.
D. Wall Mounted Carrier: ANSI A112.6.1; adjustable cast iron frame, integral drain hub and vent, adjustable spud. Lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.9 LAVATORY (L-1)

A. Basin: ANSI A112.19.2; white vitreous china; handicapped wall-hung lavatory 21-1/4 X 18-1/8”, with 5-inch-high back, drillings on 4-inch centers, overflow and soap depression; Model Kingston K2005 manufactured by Kohler, no substitutions.
B. Trim: ANSI A112.18.1; chrome plated vandal resistant combination supply fitting with offset open grid strainer and tailpiece, 0.5 GPM water aerator, vandal resistant battery powered sensor type faucet, TMV Watts LFUSG-B-M2, chrome plated 17-gauge brass P-trap (installed parallel with wall) and arm with escutcheon; manufactured by Sloan. Provide under sink protective pipe covering for P-trap, tailpiece, angle valves, supply tubing, and TMV; Model 103 as manufactured by Truebro, Inc. Faucet Trim to be Kohler Coralais K-15199-4NDRA, no substitutions.
C. Wall Mounted Carrier: ANSI A112.6.1; cast iron and steel frame, lugs for wall attachment, exposed bracket supports, bearing plate and studs.
D. Stops: Chrome plated brass quarter turn stop, ⅜-inch O.D. flexible riser and female compression inlet.

2.10 STOPS

A. Stops: ANSI A112.18.1; chrome plated brass quarter turn stop, 3/8-inch O.D. flexible riser and 3/8-inch female compression inlet; Model G2 Series manufactured by Brasscraft, or equal.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install each water closet with neoprene rubber closet gasket; felt or wax rings will not be accepted.
B. Install each fixture with trap, easily removable for servicing and cleaning.
C. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops reducers and escutcheons on each service to fixture.
D. Install components level and plumb.
E. Install and secure fixtures in place with wall carriers and bolts.
F. Seal fixtures to wall and floor surfaces with sealant; color to match fixture.
G. Mount fixtures to the heights as specified on Architectural Drawings.

3.2 ADJUSTING AND CLEANING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise or overflow.
B. At completion, clean plumbing fixtures and equipment.
C. Solidly attach water closets to floor with new lag screws. Lead flashing is not intended hold fixture in place. Adjust closet flange as required.
D. Contractor to remove each aerator or strainer screen and flush piping system at each fixture.

3.3 FIXTURE ROUGH-IN SCHEDULE

A. Rough-in fixture piping connections in accordance with following table of minimum sizes for particular fixtures.

	Hot Water	Cold Water	Waste	Vent
Water Closet	----	1-1/4-inch	4-inch	2-inch
Lavatory	½-inch	½-inch	2-inch	1½-inch

END OF SECTION

SECTION 15890

DUCTWORK

PART 1 - GENERAL

1.1 WORK INCLUDED
A. Insulated flexible ductwork.
B. Low pressure (rectangular) ductwork.
C. Low pressure (round) ductwork.
D. Installation of all dampers in ductwork.

1.2 RELATED SECTIONS
A. Section 15140 - Supports and Anchors: Sleeves.
B. Section 15190 – Mechanical Identification
C. Section 15290 - Duct Insulation.
D. Section 15910 - Ductwork Accessories.
E. Section 15940 - Air Inlets and Outlets.

1.3 REFERENCES
A. ASTM A 36 - Structural Steel.
B. ASTM A 90 - Weight of Coating on Zinc Coated (Galvanized) Iron or Steel Articles.
C. ASTM A 366 - Steel, Sheet, Carbon, Cold Rolled, Commercial Quality.
D. ASTM A 525 - General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process.
E. ASTM A 527 - Steel Sheet, Zinc Coated (Galvanized) by Hot Dip Process, Lock Forming Quality.
F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
G. SMACNA - HVAC Air Duct Leakage Test Manual.
H. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
I. UL 181 - Factory Made Air Ducts and Connectors.

1.4 PERFORMANCE REQUIREMENTS
A. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.5 REGULATORY REQUIREMENTS
A. Construct ductwork to N.F.P.A. 90A standards.
B. Conform to International Mechanical and Energy Code 2015.

1.6 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Shop Drawings: Submit one-quarter-inch shop drawing layouts of all ductwork systems prior to fabrication. Drawings are to be coordinated with other trades.
C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.

1.7 PROJECT RECORD DOCUMENTS
A. Submit under provisions of Division 1 General Requirements.
B. Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.8 QUALITY ASSURANCE
A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
B. Maintain one copy of document on site.

1.9 REGULATORY REQUIREMENTS
A. Construct ductwork to NFPA 90A standards.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
B. Maintain temperatures during and after installation of duct sealants.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Non-combustible or conforming to requirements for Class 1 air duct materials or UL 181.
B. All exposed ductwork that is to be painted shall be paint grip galvanized steel ductwork. ASTM A527 galvanized steel sheet. Lock forming quality G90 zinc coating in conformance with ASTM A90.
C. Steel Ducts: ASTM A525 or ASTM A527 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. for each side in conformance with ASTM A90.
D. Fasteners: Rivets, bolts, duct mate (TM) or sheet metal screws.
E. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape or heavy mastic.
F. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end or continuously threaded.

2.2 FLEXIBLE DUCTWORK

A. Acceptable Manufacturers:
   1. Thermaflex - Flexible Technologies.
   2. Flex-Master.
   3. Wiremold.
   4. Technaflax.
   5. No substitutions.
B. Product:
   1. Flexible air ducts for connections between branch low pressure ductwork and diffusers, registers and grilles.
   2. Ductwork shall be Thermaflex Type M-KE air duct listed by Underwriter's Laboratories Standard 181 as a Class 1 flexible air duct and complying NFPA Standards 90A and 90B. Duct shall be factory made and composed of a CPE liner permanently bonded to a coated spring wire helix and supporting a fiberglass insulating blanket. Low permeability outer vapor barrier of fiberglass reinforced film laminate shall complete the composite.
      a. Maximum velocity - 4000 FPM.
      b. Maximum positive pressure through 12-inch diameter - 10-inches.
      c. Maximum positive pressure over 12-inch diameter - 4-inches.
      d. Maximum negative pressure through 12-inches - 1-inch.
      e. Thermal conductance - 0.23 BTU / Hr. /sq. ft. at 75 degrees F.
      f. Maximum flame spread 25; maximum smoke developed 50.
   3. Install all flexible ducts to grilles, diffusers, registers and branch ducts with galvanized steel strap, cadmium plated and fastened with a slotted bolt.

2.3 LOW PRESSURE (RECTANGULAR) DUCTWORK

A. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing and sealing for operating pressure indicated.
B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.

C. Construct T's, bends and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
E. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
F. Use crimp joints with or without bead for joining round ducts sizes 8-inch and smaller with crimp in direction of air flow.
G. Use double nuts and lock washers on threaded rod supports.
H. Seal all joints and fittings throughout the low-pressure duct system (supply side) with SMACNA approved sealants. Sealants to have a service temperature range of -30 degrees F. to +175 degrees F.

2.4 LOW PRESSURE (ROUND) DUCTWORK

A. Duct rated for 1" pressure class.
B. Adjustable elbows for all changes of direction.
C. All fittings shall be screwed to duct.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible. 2015 International Energy Conservation Code.
C. Duct Sizes are inside clear dimensions for lined ducts, maintain sizes inside lining.
D. Provide openings in ductwork where required to accommodate controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
F. Use crimp joints with or without bead for joining round duct sizes 8-inch and smaller with crimp in direction of air flow.
G. Use double nuts and lock washers on threaded rod supports.
H. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
I. Connect diffusers to low pressure ducts with 3 feet maximum length of flexible duct held in place with strap or clamp.
J. Connect flexible ducts to metal ducts with adhesive plus draw bands. Flexible duct allowed for final connection to diffuser only (3’-0” max. length).
K. Seal all joints in ductwork with United duct sealer and per the International Energy Conservation Code.
L. Use UL-181A or 181B tapes and mastics on joints, seams and connections per SMACNA HVAC Duct Construction Standards and seal all ductwork per International Energy Conservation Code.
M. Connect ducts to fans and other air distribution equipment with mechanical fasteners, seals, mastics or gaskets.

3.2 INSTALLATION OF DIVISION 17 PRODUCTS

A. Install gauges, temperature and pressure sensors and other instrumentation in the locations directed by the BAS contractor.
B. Failure of this contractor to adequately coordinate his work with the BAS contractor shall not be justification for any request for additional payment.
C. This contractor shall include the cost of coordinating and installing related BAS components in his bid.
D. Install duct smoke detectors provided by electrical contractor.

3.3 SCHEDULES

A. DUCTWORK

Air System	Material	Material Pressure
Low Pressure Supply (Heating and Cooling Systems)	Steel	2”
Return and Relief	Steel	2” (Negative)

END OF SECTION

SECTION 15910

DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 WORK INCLUDED
A. Air turning devices/extractors.
B. Duct access doors.
C. Duct test holes.
D. Flexible duct connections.
E. Volume control dampers.

1.2 RELATED SECTIONS
A. Section 15890 - Ductwork.

1.3 REFERENCES
A. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
B. NFPA 70 - National Electrical Code.
C. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
D. UL 33 - Heat Responsive Links for Fire Protection Service.
E. UL 555 - Fire Dampers and Ceiling Dampers.

1.4 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.

1.5 PROJECT RECORD DOCUMENTS
A. Submit under provisions of Division 1 General Requirements.

1.6 REGULATORY REQUIREMENTS
A. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories Inc., as suitable for the purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Deliver, store, protect and handle products to site under provisions of Division 1 General Requirements.
B. Protect dampers from damage to operating linkages and blades.

1.8 EXTRA MATERIALS
A. Provide two of each size and type of fusible link.

PART 2 - PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS
A. Multi blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 DUCT ACCESS DOORS
A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one-inch thick insulation with sheet metal cover.
   1. Less Than 12-inches Square: Secure with sash locks.
   2. Up to 18-inches Square: Provide two hinges and two sash locks.

3. Up to 24 x 48-inches: Three hinges and two compression latches with outside and inside handles.
4. Larger Sizes: Provide an additional hinge.

C. Access doors with sheet metal screw fasteners are not acceptable.

2.3 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist on metal caps.
B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.4 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
B. Connector: Fabric crimped into metal edging strip.
   1. Fabric: UL listed fire retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq. yd.
   2. Net Fabric Width: Approximately 3-inches wide.
C. Leaded Vinyl Sheet: Minimum 0.55-inch-thick, 0.87 lbs. per sq. ft., 10 dB attenuation in 10 to 10,000 Hz range.

2.5 VOLUME CONTROL DAMPERS

A. Manufacturers:
   1. Ruskin.
   2. Air Balance.
   3. Vent Products.
B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and as indicated.
C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30-inch.
D. Multi Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 4 x 72". Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
E. End Bearings: Except in round ductwork 12-inches and smaller, provide end bearings. On multiple blade dampers, provide oil impregnated nylon or sintered bronze bearings.
F. Quadrants:
   1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.
   3. Where rod lengths exceed 30-inches provide regulator at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 15890 for duct construction and pressure class.
B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8-inch size for hand access, 18 x 18-inch size for shoulder access, and as indicated.
C. Provide duct test holes where indicated and required for testing and balancing purposes.
D. Demonstrate re setting of fire dampers to Owner's representative.

E. Provide flexible connections immediately adjacent to equipment in ducts associated with all fans and motorized equipment and supported by vibration isolators.
F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take off.
G. Provide balancing dampers on duct take off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
H. Manual balancing dampers shall be multi blade type for any duct where the dimension perpendicular to the damper blades is greater than 14".

END OF SECTION

SECTION 15940

AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 WORK INCLUDED
A. Registers/Grilles
B. Diffusers

1.2 REFERENCES
A. ADC 1062 - Certification, Rating and Test Manual.
B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
C. ARI 650 - Air Outlets and Inlets.
D. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
E. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
F. NFPA 70 - National Electrical Code.
G. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.4 PROJECT RECORD DOCUMENTS
A. Record actual locations of air outlets and inlets.

1.5 QUALITY ASSURANCE
A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
B. Test and rate louver performance in accordance with AMCA 500.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Carnes.
B. Krueger.
C. Metalaire.
D. Price.
E. Titus.
F. Tuttle and Baily.
G. Nailor.

2.2 SQUARE/RECTANGULAR CEILING DIFFUSERS
A. Type: Square, adjustable pattern, stamped, multi core diffuser to discharge air in 360-degree pattern.
B. Frame: Inverted T bar type. In plaster ceilings, provide plaster frame and ceiling frame.
C. Fabrication: Steel with baked enamel finish selected by Architect.
D. Accessories: Radial opposed blade damper and multi louvered equalizing grid with damper adjustable from diffuser face.

2.3 SUPPLY REGISTERS/GRILLES
A. Type: Aluminum border and individually adjustable blades, ¾-inch blade spacing, single deflection.

B. Frame: 1¼-inch margin with countersunk screw mounting and gasket.
C. Factory baked enamel finish as selected by Architect.
D. Damper: Aluminum opposed blade type, operable from face.

2.4 RETURN GRILLES/REGISTERS

A. Return grilles shall be 1/2" blade spacing with 0-degree fixed deflection blades. Blades shall be parallel to the long dimension of the grille or register.
B. Construction shall be of steel or aluminum as scheduled with a 1¼" wide border on all sides. Screw holes shall be countersunk for a neat appearance.
C. Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test data. Blades shall be firmly held in place by mullions from behind the grille and fixed in place by welding.
D. The grille finish shall be baked anodic acrylic paint as selected by the Architect.
E. Opposed blade volume damper shall be constructed of heavy gauge steel, operable from the face of the register.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
C. Install diffusers to ductwork with air tight connection.
D. Provide balancing dampers on duct take off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION

SECTION 15950

TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Testing, adjustment, and balancing of air systems.

1.2 RELATED SECTIONS
A. General Conditions - Starting of Systems.
B. Division 15 Specifications.
C. Division 16 Specifications.

1.3 REFERENCES
A. AABC - National Standards for Total System Balance.
B. ADC - Test Code for Grilles, Registers, and Diffusers.
C. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air conditioning, and Refrigeration Systems.
D. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
E. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

1.4 SUBMITTALS
A. Submit under provisions of Division 1 General Requirements.
B. Submit name of adjusting and balancing agency for approval within 30 days after notice of award of Contract.
C. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
D. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
E. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.
F. 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.
G. Test Reports: Indicate data on AABC National Standards for Total System Balance forms.
H. BAS Contractor shall provide to the Test & Balance Company the following minimum information to help expedite the initial review of the HVAC System:
    1. Provide design drawings and specifications for balancing review.
    2. Layout the project on data sheets to further review the design for correct total air flows, pump flows, box sizes, etc.
    3. Provide sheet metal shop drawings.
    4. Provide equipment submittals.
    5. Provide control company submittals.
I. BAS Contractor shall submit complete background experience of his proposed Air and Water Testing and Balancing Contractor for Architect/Engineer’s approval before executing a contract for the work.

1.5 PROJECT RECORD DOCUMENTS
A. Submit under provisions of Division 1 General Requirements.
B. Record actual locations of flow measuring stations, balancing valves and rough setting.

1.6 QUALITY ASSURANCE
A. The TAB firm shall be a sub-contractor to the Mechanical Contractor and have at least fifteen (15) years successful testing, adjusting and balancing experience on projects with testing and balancing requirements similar to those required for this project.

B. The TAB firm SHALL NOT BE THE ORIGINAL INSTALLER of the systems or equipment to be tested and shall not be related to any of the successful Mechanical Contractors. He shall otherwise act as an independent contractor that specializes in and whose business is limited to testing and balancing.
C. Work shall be done under the direct supervision of a qualified test and balance engineer employed by the TAB contractor. Instruments used by this contractor shall be accurately calibrated and maintained in good working order. If requested, tests shall be conducted in the presence of the Engineer or Owner.

1.7 SEQUENCING AND SCHEDULING

A. Sequence work to commence after completion of each system and schedule completion of work before Substantial Completion of Project. TBS Contractor shall coordinate his work with the Building Automation Contractor's work. Refer to Division 1 for Sequence of Construction for each school. TAB Contractor shall be required to start and stop work as required to accommodate phase sequence of each school.

PART 2 - PRODUCTS

(Not Used.)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Fire and volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed and duct end caps are in place.
   10. Air outlets are installed and connected.
   11. Duct system leakage is minimized.
   12. Hydronic systems are flushed, filled, and vented.
   13. Pumps are rotating correctly.
   14. Proper strainer baskets are clean and in place.
   15. Service and balance valves are open.
B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
C. Beginning of work means acceptance of existing conditions.

3.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.
B. Provide additional balancing devices as required.

3.3 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.
D. Balance to reduce/eliminate objectionable noise and note on report as required.

3.4 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.
B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

3.5 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, exhaust fresh air quantities.
B. As a minimum, air system shall be prepared for testing in the following manner:
    1. Using pitot tube transverse, set main line dampers to deliver proper air volumes to zones.
    2. Using pitot tube transverse, set branch line dampers to deliver proper air volumes to air terminal outlets in each zone.
    3. Read CFM at each air terminal outlet and adjust to meet design requirements. Test and record items as listed in the following test procedures.
        a. Test and adjust fan RPM to design requirements.
        b. Test and record fan motor full amperes.
        c. Make pitot tube transverse of main air ducts and obtain design volume at fans.
        d. Test and record system static pressure at fan suction and discharge.
        e. Test and adjust system for design recirculated air volume.
        f. Test and adjust system for design outdoor air volume.
        g. Adjust main duct to proper design volume.
        h. Adjust zones to proper design volume supply and return/exhaust.
        i. Test and adjust each air terminal to within tolerance of 10 percent or as specified on the drawings.
    4. In cooperation with the control manufacturer's representative, who is responsible for setting adjustments of automatically operated dampers to operate as specified, indicated and/or noted, TAB agency shall check controls for proper operation and list controls requiring adjustment by control installer.
    5. Air terminal outlets shall be adjusted to minimize drafts. Adjust air patterns to match plans.
C. Adjust outside air automatic dampers, outside air, return air and exhaust dampers for design conditions.
D. Measure temperature conditions across outside air, return air and exhaust dampers to check leakage.
E. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling and at minimum air flow rate, full heating.

F. Measure building static pressure and adjust supply, return and exhaust air systems to provide required relationship between each to maintain approximately 0.02 inches positive static pressure near the building entries.
G. The Mechanical contractor shall provide and install replacement sheaves, belts, pulleys, etc. as required to meet final balancing requirements.

3.6 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing (Including but Not Limited to):
   1. Existing Air Handling Units
   2. Air Inlets and Outlets
B. Report Forms
   1. Title Page:
      a. Name of Testing, Adjusting, and Balancing Agency
      b. Address of Testing, Adjusting, and Balancing Agency
      c. Telephone number of Testing, Adjusting, and Balancing Agency
      d. Project name
      e. Project location
      f. Project Architect
      g. Project Engineer
      h. Project Contractor
      i. Project altitude
      j. Report date
   2. Summary Comments:
      a. Design versus final performance
      b. Notable characteristics of system
      c. Description of systems operation sequence
      d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
      e. Nomenclature used throughout report
      f. Test conditions
   3. Instrument List:
      a. Instrument
      b. Manufacturer
      c. Model number
      d. Serial number
      e. Range
      f. Calibration date
   4. Electric Motors:
      a. Manufacturer
      b. Model/Frame
      c. HP/BHP
      d. Phase, voltage, amperage; nameplate, actual, no load
      e. RPM
      f. Service factor
      g. Starter size, rating, heater elements
      h. Sheave Make/Size/Bore
   5. V Belt Drive:
      a. Identification/location
      b. Required driven RPM
      c. Driven sheave, diameter and RPM
      d. Belt, size and quantity
      e. Motor sheave diameter and RPM
      f. Center to center distance, maximum, minimum, and actual

6. Cooling Coil Data:
   a. Identification/number
   b. Location
   c. Service
   d. Manufacturer
   e. Air flow, design and actual
   f. Entering air DB temperature, design and actual
   g. Entering air WB temperature, design and actual
   h. Leaving air DB temperature, design and actual
   i. Leaving air WB temperature, design and actual
   j. Air pressure drop, design and actual
7. Water Heating Coil Data:
   a. Identification/number
   b. Location
   c. Service
   d. Manufacturer
   e. Air flow, design and actual
   f. Water flow, design and actual
   g. Water pressure drop, design and actual
   h. Entering water temperature, design and actual
   i. Leaving water temperature, design and actual
   j. Entering air temperature, design and actual
   k. Leaving air temperature, design and actual
   l. Air pressure drop, design and actual
8. Air Moving Equipment
   a. Location
   b. Manufacturer
   c. Model number
   d. Serial number
   e. Arrangement/Class/Discharge
   f. Air flow, specified and actual
   g. Return air flow, specified and actual
   h. Outside air flow, specified and actual
   i. Total static pressure (total external), specified and actual
   j. Inlet pressure
   k. Discharge pressure
   l. Sheave Make/Size/Bore
   m. Number of Belts/Make/Size
   n. Fan RPM
9. Return Air/Outside Air Data:
   a. Identification/location
   b. Design air flow
   c. Actual air flow
   d. Design return air flow
   e. Actual return air flow
   f. Design outside air flow
   g. Actual outside air flow
   h. Return air temperature
   i. Outside air temperature
   j. Required mixed air temperature
   k. Actual mixed air temperature
   l. Design outside/return air ratio
   m. Actual outside/return air ratio

10. Duct Traverse:
    a. System zone/branch
    b. Duct size
    c. Area
    d. Design velocity
    e. Design air flow
    f. Test velocity
    g. Test air flow
    h. Duct static pressure
    i. Air temperature
    j. Air correction factor
11. Duct Leak Test:
    a. Description of ductwork under test
    b. Duct design operating pressure
    c. Duct design test static pressure
    d. Duct capacity, air flow
    e. Maximum allowable leakage duct capacity times leak factor
    f. Test apparatus
        1) Blower
        2) Orifice, tube size
        3) Orifice size
        4) Calibrated
    g. Test static pressure
    h. Test orifice differential pressure
    i. Leakage
12. Air Distribution Test Sheet:
    a. Air terminal number
    b. Room number/location
    c. Terminal type
    d. Terminal size
    e. Area factor
    f. Design velocity
    g. Design air flow
    h. Test (final) velocity
    i. Test (final) air flow
    j. Percent of design air flow

END OF SECTION

SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and the General Requirement Specification, apply to this and the other sections of Division 16.
B. The Section is hereby made a part of all other sections of Division 16 as fully as if repeated in each therein.

1.2 SECTION INCLUDES

A. Descriptions.
B. Quality assurance.
C. Codes.
D. Approvals.
E. Permits and inspections.
F. Fees.
G. Submittals.
H. Instruction.
I. Overtime
J. Alternates
K. Guarantees.
L. Warranty.
M. Products
N. Execution.

1.3 RELATED SECTIONS

A. Substitutions: Refer to the General Requirements and 16 Sections.
B. Shop Drawings: Refer to the General Requirements and 16 Sections.
C. Operation and Maintenance Data: Refer to the General Requirements and 16 Sections.
D. Coordination with Other Trades: Refer to the General Requirements, 15, and1 16 Sections.

1.4 DEFINITIONS

A. Provide all required products and execution for a complete and fully operational Electrical System. Such work includes, but is not limited to, that which is identified on the contract documents. For the purpose of this specification, the following terms are defined:
    1. “Contract documents” include the most current project drawings and specification.
    2. “Provide” includes furnishing and installation.
    3. “Furnish” includes purchasing and transporting new equipment, as specified, to the job site.
    4. “Install” includes mounting or setting equipment in place, in specified location, making all required electrical connections for a working product.
    5. “Electrical System” includes all distribution of power, lighting, fire protection, life safety, communications, security, special systems, and any other information, electrical in nature, identified on the Contract Documents, from the point(s) of service to utilization device(s).
    6. “Connecting” means providing a power source, overcurrent devices, raceways, conductors, terminations, insulation supports, and other materials and equipment required for the operation and control of the relevant operation.
B. Provide materials, equipment, installation or testing identified on the drawings but not specified herein; or that which is specified herein, but not identified on the drawings shall be provided at no additional cost to the Owner.
C. Provide materials or equipment including minor items, accessories, or devices reasonably inferable as necessary for the completion and proper operation of any systems or products identified on the Contract Documents.

1.5 QUALITY ASSURANCE

A. Discovery of any conflicting design information or any design intentions which are not readily interpreted shall be referred to the Architect/Engineer for further description or illustration prior to any product selection or execution of work.
B. Discovery of any materials or equipment which are damaged, unsuitable, incompatible, or non-compliant with any applicable codes, laws, ordinances, or other regulations shall be brought to the direct attention of the Architect/Engineer.
C. Generally, the Drawings establish the location, quantity and relationship of the parts of the work, and the specifications define the type and quality of materials and workmanship. Work shown in the drawings and not mentioned in the specifications or required by the specifications and not shown on the drawings, shall be provided as if fully provided for in both. In the case of conflicts between the drawings and specifications, or within either document, the Architect/Engineer shall determine the intent. In such cases, in general, the more stringent requirement concerning greater quantity, quality, and/or resulting in a higher cost shall govern without further cost to the Owner.
D. The equipment list contained in this specification includes only the major equipment requirements. Verify the completeness and suitability of device to meet the intent of the specifications. Any additional equipment required, even if not specifically mentioned herein, shall be provided without claim for additional payment; it being understood that a complete operating system, satisfactory to the Engineer and the Owner, is required in all cases.

1.6 REGULATORY REQUIREMENTS

A. Where governing codes indicate the Drawings and Specifications do not comply with the minimum requirements of applicable codes, the Contractor shall either notify the Architect/Engineer in writing during the bidding period identifying the revisions required to meet code requirements or provide an installation which will comply with the code requirements.
B. All material, equipment, installation and testing should be in accordance with all applicable codes, laws, and ordinances of Federal, State and local governing bodies having jurisdiction.
C. In case of differences between building codes, Federal and State laws, local ordinances and utility company regulations and the Contract Documents, the most stringent shall govern.
D. Where any materials, equipment or installation is not in compliance with the more stringent of the applicable codes, laws, ordinances, regulations and contract documents, they shall be entirely removed, replaced, modified or otherwise corrected at no additional cost to the Owner.
E. Materials, equipment, installation and testing shall conform to the latest editions of the applicable following codes:
    1. BOCA - Building Officials and Code Administrators.
    2. NEC - National Electrical Code.
    3. State of Illinois Building Code.
    4. NFPA 72 - National Fire Protection Association.
    5. IBC - International Building Code.
F. All product materials and work shall comply with all local codes, including but not limited to the following codes and standards as applicable, in addition to any codes and standards referenced within individual specification sections. These codes and standards shall apply to all Division 26 Sections as applicable.
    1. ANSI - American National Standards Institute.
    2. ASTM - American Society for Testing Materials.
    3. CBM - Certified Ballast Manufacturers.
    4. ETL - Electrical Testing Laboratories.
    5. IEEE - Institute of Electrical and Electronic Engineers.
    6. NBS - National Bureau of Standards.
    7. NEMA - National Electrical Manufacturer’s Association.
    8. NFPA - National Fire Protection Association.
    9. OSHA - Occupation Safety and Health Act.
    10. UL - Underwriters Laboratories.

11. ADA - Americans with Disabilities Act.
12. IECC – International Energy Conservation Code.
13. NEC - National Electrical Code.
14. IBC - International Building Code.
15. IEC - International Electrical Code.
16. IFC - International Fire Code.

G. Where a UL standard is available, the equipment supplied for the project shall be UL listed and shall bear the UL label.
H. Notify the Architect/Engineer of any materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction.
I. In every installation where regulations of electric utility, telephone and cable TV companies apply, conformance with their regulations is mandatory and any costs involved shall be included in the Contract, with the exception of extra facility and other charges which are directly paid by the Owner.

1.7 APPROVALS

A. Prepare shop drawings and obtain approvals from inspection authorities for emergency and exit lighting, fire alarm and life safety systems, and other electrical installations requiring specific approval.
B. Prepare shop drawings and obtain approvals from governmental agencies and utility companies for applicable electrical installations requiring approval.
C. Copies of the final approved drawings shall be delivered to the Architect/Engineer. Approvals shall be obtained before commencement of related work.

1.8 PERMIT AND INSPECTION

A. Permit: Obtain and pay for all permits, bonds, license, tap-in fees, etc. Required by the City, State, or other authority having jurisdiction over the work.
B. Inspections: Arrange and pay for all inspections required by the above when they become due as part of the work of sections affected. Conceal no work until approved by these governing authorities.
C. Engineer inspections include one above ceiling review and report before ceiling conceal work, one substantial review report and one final review report. All additional review reports required due to incomplete or non-acceptance of substantial or final conditions will require the contractor to pay the engineer $650.00 per additional inspection review and report.

1.9 FEES

A. Pay fees and other charges incidental to electrical work and obtain and pay for required insurance, permits, licenses, inspections and taxes. Arrange for required inspections and delivery certificates and approvals for same to the Architect/Engineer.

1.10 SUBMITTALS

A. Shop Drawings: As soon as practical and before any material or equipment is purchased, the Contractor shall submit shop drawings. A complete list in one category (example: all fixtures) of all shop drawings catalog cuts, material lists, etc. are to be submitted by this Contractor at one time. No consideration will be given to partial shop drawings submitted from time to time.
    1. Extended time for submitting special shop drawings may be requested; however, any extension of time approved does not relieve this Contractor of his responsibility of executing his work in accordance with this contract.
    2. Any listed materials, fixtures, apparatus, or equipment that are not in accordance with specifications requirements can and will be rejected for use in this installation and construction. Substitutions will not be permitted.

3. Any materials, fixtures, apparatus or equipment installed without stamped or written approval shall be removed by the Contractor and replaced with specified equipment at the direction of the Architect/Engineer and without recourse for additional compensation.
4. Review of shop drawings does not relieve the Contractor from any responsibility for deviation from the Contract Documents unless the deviation is specifically identified on the shop drawings.
5. Contractor shall review and coordinate all shop drawings prior to submitting them for Architects/ Engineer's review. Contractor shall stamp each shop drawing to certify that all MEP related contractors have coordinated and reviewed it. Engineer will not check any shop drawings that Contractor has not stamped with his review certification.
6. Prior to ordering any switchboard, distribution panels, panelboards, or transformers, the contractor shall submit dimension drawings showing the switchboard will fit in the location shown on the drawings. In the event of conflicts, the contractor shall request a written clarification from the Architect/Engineer.

B. Operation and Maintenance Data: Refer to the General Requirements and Division 26 Sections. Submit four copies of maintenance manuals in hardbound covers containing approved shop drawings and manufacturer's repair manuals, guarantees, operating instructions, wiring diagram and part lists.

1.11 OPERATION AND MAINTENANCE INSTRUCTION

A. Provide operation and maintenance instruction for equipment and systems.

1.12 OVERTIME WORK

A. All construction work shall be done on regular working hours and days, unless otherwise specified. If overtime work, other than specified, is required on the project, it shall be performed as indicated.
B. System shutdown shall occur during off business hours and shall be done on over-time basis.
C. The base bid shall include overtime work specified. No compensation shall be made for other work done on overtime basis, unless authorized.

1.13 ALTERNATES

A. Accepted alternates, if any, may affect portions of the Base Bid Work.
B. Acceptance of alternates shall include provisions necessary to alter, adjust or otherwise modify work affected by the alteration.
C. Shop drawings shall include alternate work and shall reflect changes necessitated to other work.

1.14 GUARANTEE

A. Electrical work shall be guaranteed for both materials and labor for a period of one year.
B. On-the-premises maintenance shall be provided at no cost to the purchaser for one year from the date of an operational and accepted installation unless damage is caused by misuse or abuse.
C. Guarantee all wiring and equipment to be free from inherent and mechanical defects due to workmanship and materials used for the period of one full year from date of operational and accepted installation. Replacement of all or part of the equipment and/or correction of such defects, including labor, shall be rendered without cost to the Owner with the guarantee period.
D. Manufacturer's equipment guarantees or warranties for periods of more than one year shall be included in the Operation and Maintenance Data.

1.15 WARRANTY

A. Warranty period shall be one year after final acceptance and payment of the system. Repairs or replacements made under the warranty shall bear an additional 1-year warranty dated from final acceptance of the repair or replacement. The Owner shall receive the benefit of all warranties furnished by manufacturers.

1.16 PROJECT/SITE CONDITIONS

A. Carefully examine the contract documents, visit the site, and thoroughly become familiar with the local conditions relating to the work prior to bidding. Failure to do so will not relieve the contractor of the obligations of the Contract.
B. Install Work in locations shown on Drawings, unless prevented by Project conditions.
C. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.17 CONTRACTOR'S RESPONSIBILITY TO VERIFY EQUIPMENT DIMENSIONS

A. The drawings, schedules and specifications have been prepared using one manufacturer for each piece of equipment as the basis for dimensional design. If the Contractor purchases equipment listed as a specified Acceptable Manufacturer but is not the scheduled manufacturer used for the base design, the Contractor shall be responsible for checking all the dimensions of the equipment to verify that it will fit in the space shown on the Drawings. Minor deviations in dimensions will be permitted, provided the ratings meet what was shown on the drawings and equipment will physically fit into the space allocated with suitable access around equipment for operation and maintenance on the equipment.
B. Contractor and/or manufacturer shall verify that the capacity and duty specified meets the characteristics of the equipment he submits for review.
C. If equipment is submitted for review and does not meet the physical size or arrangement of what was scheduled and specified, Contractor shall pay for all alternations required to accommodate such equipment at no additional cost to the Owner. Contractor shall also pay all costs for additional work required by other Contractors, Owner, Architect or Engineer to make changes which would allow the equipment to fit in the space.

1.18 CONTRACTOR'S RESPONSIBILITY TO VERIFY EXISTING CONDITIONS AND OPENINGS

A. Contractor shall field verify the size of existing openings, windows, doors, corridors, rooms, etc. for access of the new equipment into the existing building. If openings are too small for access, then Contractor shall provide new or enlarged openings, at his own expense, to facilitate entrance into existing space or building. Contractor may elect to order the equipment disassembled and/or with split housing for entrance into the existing space or building. Contractor shall reassemble equipment after it is in the space at his own expense.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Proposal shall be based upon the furnishing of all materials and equipment as specified, which in every case shall be new and, where not specifically referred to by manufacturer's name, of the best grade and quality available.
B. Equipment and material shall be without blemish or defect and shall not be used for temporary light or power purposes, including lamps, without the Architect/ Engineer's written authorization.
C. Items of equipment of one generic type (such as fuses), except conduit, conduit fittings, outlet boxes, wiring and cable, shall be the product of one manufacturer throughout, unless otherwise indicated or accepted by the Architect/Engineer.
D. Where two or more makes or kinds of materials or equipment are specified, indicate which of these choices will be used. This information shall be included with the list of manufacturers for equipment and materials to be submitted to the Architect/Engineer.
E. Manufacturers of equipment shall be firms regularly engaged in manufacturing factory-fabricated systems and equipment whose products have been in satisfactory use in similar service for not less than 5 years.

2.2 MANUFACTURERS' NAMEPLATES

A. Each major electrical component such as switchgear, transformers, motor control centers, panelboards, circuit breakers, disconnect switches, etc. shall have the manufacturer's name, address, catalog number, model number, rating, and any other required specified markings on a plate or label located inside the cover or otherwise inconspicuously but readily accessible.

PART 3 - EXECUTION

3.1 DELIVERY AND STORAGE

A. Receive, handle, and store electrical items and materials at the project site. Materials and electrical items shall be so placed that they are protected from damage and deterioration.
B. Existing equipment which is to be reused shall be cleaned and protected against damage. Equipment which is removed and stored for reuse shall be stacked, boxed or crated in such a manner as to prevent damage. The cost to repair/replace this equipment due to damage incurred during its removal, storage or reinstallation shall be borne by the Contractor.
C. The Contractor shall bear full responsibility for equipment judged unacceptable due to his failure to comply with these specifications.

3.2 INSTALLATION

A. The Drawings for work under Division 16 are diagrammatic and are intended to convey the scope of work and indicate the general arrangement of conduit, boxes, equipment, fixtures and other work included in the Contract.
B. Location of items required by the Drawings or specifications not definitely fixed by dimensions are approximate only and exact locations necessary to secure the best conditions and results shall be determined at the site and shall be subject to the approval of the Architect/Engineer.
C. Follow Drawings in laying out work, check drawings of other trades to verify spaces in which work will be installed and maintain maximum headroom and space conditions at all points.
    1. Where headroom or space conditions appear inadequate, the Architect/Engineer shall be notified before proceeding with installation.
    2. Minor conduit rerouting and changes shall be made at no additional cost to the Owner.
D. Perform all work with skilled mechanics of the particular trade involved in a neat and workmanlike manner.
E. Perform all work in cooperation with other trades and schedule.
F. Perform all work in accordance with the manufacturer's recommendations.
G. Furnish other trades advance information on locations and sizes of frames, boxes, sleeves and openings needed for the work, and also furnish information and shop drawings necessary to permit trades affected to install their work properly and without delay.
H. Where there is evidence that work of one trade will interfere with the work of other trades, all trades shall assist in working out space allocations to make satisfactory adjustments and shall be prepared to submit and revise coordinated shop drawings.
I. With the approval of the Architect/Engineer and without additional cost to the Owner, make minor modifications in the work as required by structural interferences, by interferences with work of other trades or for proper execution of the work.
J. Work installed before coordinating with other trades so as to cause interference with the work of such other trades shall be changed to correct such condition without additional cost to the Owner and as directed by the Architect/Engineer.
K. Architect/Engineer reserves the right to change location of electrical equipment or device within 10'-0" radius before work is installed without extra charge.
L. Electrical Contractor shall cooperate with other trades and coordinate work so that conflicts with other work are eliminated.

M. Equipment shall be installed with adequate space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment which is to be installed or which is in place. Electrical Contractor shall verify measurements. Discrepancies shall be brought to the Architect/Engineer's attention for interpretation.
N. Determine temporary openings in the buildings that will be required for the admission of apparatus furnished under this Division and notify the Architect/Engineer accordingly. In the event of failure to give sufficient notice in time to arrange for these openings during construction, assume all costs of providing such openings thereafter.
O. Location of electrical outlets, lighting fixture, lighting panels, cabinets, equipment, etc. is approximate and exact locations shall be determined at the project.
P. Electrical Contractor shall refer to contract documents for details, reflected ceiling plans, and large-scale drawings.
Q. Apparatus, lighting fixtures, material or work not shown on the drawings, but mentioned in the project specifications, or vice versa or any included accessories such as wiring, relays, switches, transformers (line voltage or low voltage), etc., necessary to make the work complete and ready for operating, even though not specified or shown on the electrical drawings shall be furnished and installed without additional expenses to the Owner. It is the Contractor’s responsibility prior to bids to review all project documents.
R. Verify final locations for rough-ins with field measurements of the actual equipment to be connected. Refer to equipment specifications in Division 1 through 16 for rough-in requirements.
S. Equipment specified under other divisions and requiring electrical supply shall be erected, aligned, leveled and prepared for operation. Provide required controls and accessories along with installation instructions, diagrams, dimensions and supervision of installation and start-up. Provide the required electrical rough-ins and connections and confirm 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.
T. Where surface mounted conduit or surface mounted raceway is installed on new or existing walls, the electrical contractor shall paint the surface mounted conduit or surface mounted raceway to match the new or existing wall as directed by the Architect.
U. Electrical Contractor shall weatherproof all openings and penetrations through foundations and exterior walls created by fixtures and conduits to prevent moisture from entering through.
V. Contractor shall furnish other trades advance information and/or shop drawings on locations and sizes of conduits, raceways, equipment, frames, boxes, sleeves and openings, etc. needed for their work to install their work properly and without delay.
W. Contractor shall provide sleeves in beams, floors, columns and walls as shown on the drawings, as required by job site conditions, and/or as specified, when installing their work. All beams and columns which are required to be sleeved shall be cut and reinforced as required by field conditions and locations and sizes shall be checked and approved by Architect before contractor cuts any structural building member.
X. Contractor shall refer to the architectural and structural contract drawings (before submitting their bids) to familiarize themselves with the extent of the general contractor’s work, ceiling heights and clearance for installing their work.
Y. Contractor shall install all auxiliary supporting steel as required for the supporting of their conduit, fixtures, devices, equipment, etc. All supporting steel for items above a suspended ceiling shall be from new building structure members only. All supports in the existing building shall be from walls. No connection to wood, roof deck or structure is allowed.
Z. The locations shown for all lighting fixtures and ceiling mounted electrical equipment are diagrammatic. Exact location shall be determined from the reflected ceiling plans and/or on the job site by the construction manager. It shall be the contractor’s responsibility to maintain code required spacing for items such as fire alarm devices.

AA. Contractor shall be required to maintain the fire rated integrity of floors and/or wall partitions. All penetrations through fire rated building elements shall be effectively sealed using approved materials and methods.

BB. Unless indicated otherwise, the Architect/Engineer makes no representation as to whether or not any hazardous or contaminated materials (including but not limited to asbestos, PCB's, contaminated soils, etc.) are present within the existing building or on the site. Work shown on the drawings and/or indicated in the specifications shall not be construed to call for contact with any of these materials. If these materials are encountered or suspected, the contractor shall not disturb them and shall contact the architect/engineer immediately.

CC. Contractor shall store all materials and equipment shipped to the site on a protected area. If material is stored outside the building, it must be stored off the ground a minimum of six inches (6") set on 6 x 6 planks and/or wood pallets. All material and equipment must be completely covered with waterproof tarps or visqueen. All conduit will have the ends closed to keep out dirt and other debris. No equipment will be allowed to be stored on the site unless it is sitting on wood planks and completely protected with weatherproof covers.

DD. This contractor shall be responsible for furnishing all labor and material required to patch all openings in existing floors, walls, ceilings and fire separations created by the removal of this trade's material and equipment where these openings are not to be reused.

3.3 PROTECTION

A. Protect conduit and wireway openings against the entrance of foreign matter by means of plugs or caps. Cover fixtures, materials, equipment and devices or otherwise protect against damage from any cause, both before and after installation. Fixtures, materials, equipment, or device damaged prior to final acceptance of the work shall be restored to their original condition or replaced, all at no additional cost to Owner.

B. Equipment shall be inherently safe and moving parts shall be covered with guards.

3.4 COOPERATION

A. Where jurisdictional rules require the assistance of electrical mechanics in the moving and setting of electrically power equipment, provide such assistance.

B. Where work covered by this section connects to equipment furnished under other sections, verify electrical work involved in the field and make proper connection to such equipment.

3.5 CUTTING AND PATCHING

A. Do drilling, cutting, fitting and patching necessary for the installation of conduits, wireways, and other electrical equipment, and provide supports necessary for same and for bracing and anchorage of work. No cutting of structural work or of fireproofing shall be done without the written consent of the Architect/Engineer.

B. Conduits passing through roofs or other surfaces exposed to weather shall be properly flashed as specified in roofing and waterproofing sections. This flashing work shall be paid for as part of the electrical work.

3.6 WALL CHASES

A. Provide templates or details of wall chases, where conduits, pull boxes, cabinets, and other items of equipment are to be concealed or recessed, before the work of other trades is performed in the respective areas. Show exact locations and sizes of such equipment.

3.7 SLEEVES AND OPENINGS

A. Provide sleeves and openings for exposed wires, cables, and wireways where they pass through walls and floors.

B. Sleeves for individual cables shall be hot-dip galvanized inside and outside. Sleeve shall be equal in gauge to heavy wall steel conduit and extended 3 inches above finished surface or wall.

C. Furnish complete dimensioned drawings of openings required through walls and floors, for conduits, or busways, or wireways, before the work of other sections is performed in the respective areas.

D. Installation of 3-inch-high concrete curbs around openings through concrete slabs in electrical closets and other openings, shall be provided under Division 3.
E. Pack or fill sleeves and openings after the completed work is in place. Filling shall comply with U.L., match rating of original construction and shall provide a waterproof and fireproof packing to prevent leakage of liquid, smoke, or fire through the sleeve or opening.

3.8 EXECUTION, CORRELATION AND INTENT OF DOCUMENTS

A. In the event that conflicts, if any, cannot be settled promptly and amicably between the affected trades, with work proceeding in a workmanlike manner, then the Architect/Engineer shall decide which work is to be relocated and his judgment shall be final and binding on this Contractor.

3.9 ADJUSTMENTS

A. The primary adjustments of the system(s) shall be accomplished by the Contractor to the complete satisfaction of the Owner and Architect/Engineer at the time of completion of the installation.

3.10 ACCESS PANELS

A. Provide access panels as required. The access panels shall comply with Division 8.

3.11 TESTING

A. General: Furnish meters, instruments, cable connections, equipment or apparatus necessary for making all tests.
B. Insulation Tests:
   1. After being pulled in place and before being connected, test all service and feeder cables with 1000-volt, 60 Hz insulation tester for one minute to determine that conductor insulation resistance to ground is not less than that recommended by the manufacturer. Test all branch circuit conductors for lighting, receptacle and miscellaneous loads prior to connection of loads. Tests shall not register less than one megaohm to ground during an insulation test as described above for service and feeder cables. Remove, replace and retest all cable failing insulation test.
   2. Measure insulation resistance of electrical wiring with a self-contained instrument such as direct-indicating ohmmeter of the generator battery of electronic type.
   3. When using any type of d-c voltage source, it is essential that the output voltage is steady to prevent fluctuations in charging current. Where protective resistors are used in test instruments, take into account their effect on the magnitude of the voltage applied to the insulation under test. Properly maintain the instrument used in insulation resistant testing. Make periodic checks to ensure that rated voltage is delivered and that the instrument is in calibration.
   4. Unless otherwise specified, the insulation resistance shall be approximately one megaohm for each 1000 volts of operating voltage with a minimum value of one megaohm.
C. Test all motors under load, with ammeter readings taken in each phase and the RPM of motors recorded at the time. Test all motors for correct direction of rotation.
D. Documentation: Keep records of all tests, in tabulated, permanent, reproducible form, completely indexed and explained, indicating the specific test performed, environmental conditions such as temperature and humidity, date of performance, results obtained, corrective actions taken (if any), final results, and comments, if required. Copies of all tests shall be delivered to the Architect/Engineer prior to this final project review.

3.12 MOUNTING HEIGHTS

A. Mounting heights of electrical items shall be as listed below, unless otherwise specified, or by the Architect/Engineer's field instructions. Dimensions are above finished floor, unless otherwise indicated. In areas where codes require different mounting heights, as in hazardous areas, comply with code requirements.

1.	General Receptacles	- 18" to C.L.
2.	Outdoor Receptacles	- 24" to C.L.
3.	General Tele and Data Outlets	- 18" to C.L.
4.	General Toggle Switches	- 46" to C.L.
5.	Fire Alarm Pull Stations	- 46" to C.L.
6.	Security and Intercom Call Stations	- 46" to C.L.
7.	Clock and Paging Speaker Outlets	- 84" to C.L.
8.	Fire Alarm Audio-Visual Devices	- 82" to C.L.
9.	Corridor Wall Sconces ($\geq$4" deep)	- 66" to C.L.
10.	Exit Signs	- 90" to C.L.
11.	Volume Controls	46" to C.L.
12.	T.V. Outlets	82" to C.L.
13.	Individual Disconnects and Starters	- 60" to C.L.
14.	Grouped Disconnects and Starters	$\geq$ 12" to C.L. $\leq$ 72" to C.L.
15.	Panelboard Overcurrent Devices	$\geq$ 12" to C.L. $\leq$ 72" to C.L.
16.	Grouped Utility Revenue Meters	$\geq$ 30" to C.L. $\leq$ 66" to C.L.

END OF SECTION

SECTION 16060

ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions and Supplementary Conditions of the Contract of the General Requirement 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 SECTION INCLUDES

A. Electrical demolition: The work specified in this section includes providing labor, material, equipment, and services necessary for electrical demolition as shown on the drawings and as herein specified to accommodate new construction. The project includes demolition, relocation and replacement of existing electrical equipment, feeders, branch wiring, signal cables, etc. with new work. Contractor shall remove, reinstall or relocate that portion of the existing equipment, system, wiring, fixtures and drawings which are a part of or which applies to the electrical trade.
B. Selective demolition including:
   1. Non-destructive removal of materials and equipment for reuse or salvage as indicated.
   2. Dismantling electrical materials and equipment made obsolete by these installations.

1.3 RELATED SECTIONS

A. Section 16010 – Basic Electrical Provisions.

1.4 REQUIREMENTS

A. Contractor shall provide caution and warning signs at all hazardous areas and at all door entries to construction rooms and areas during the entire construction period per IEPA law and regulations.

1.5 SEQUENCING

A. Sequence the Work in accordance with Architects/Owners requirements to allow for completion of specified areas of work to be turned over to the Owner upon completion for preparation for classes to resume.

1.6 SCHEDULING

A. Schedule work to coincide with other trades and project schedule.
B. Cease operations immediately when structure appears to be in danger and notify Architect/ Engineer. Do not resume operations until directed.

1.7 COORDINATION

A. Conduct demolition to minimize interference with adjacent and occupied building areas.
B. Coordinate demolition work with the construction manager and other related trades.
C. Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.
D. Shut-down periods:
   1. Arrange timing of shut-down periods of system, service with Owner. Do not shut down any service, without prior written approval.
   2. Keep shut-down period to minimum or use intermittent period as directed by the Owner.
   3. Maintain life-safety system in full operation in occupied facilities or provide notice minimum 15 working days in advance.

1.8 MAINTAIN CONTINUITY OF SERVICE

A. Any downtime time period shall be at the convenience of the Owner and approved by the General Contractor. Contractor shall give a minimum of 15 working days prior written notice to the General Contractor in advance of any desired shutdown. Prior written notice shall include a schedule for downtime, work to be performed. All downtime period shall be on weekends or off hours with exact time period approved in advance in writing by the General Contractor. Coordinate an overall schedule that is to be submitted and approved by the General Contractor.

B. An electrician shall be on the premises when any trade is working in close proximity to live equipment or within electric rooms during renovation by any trade.
C. All premium time, overtime, labor, material and equipment costs required to accomplish the above shall be included in the Contractor's bid proposal.

1.9 PROTECTION

A. Perform removal of equipment and related components, in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures.
B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify field measurements and circuiting arrangements.
B. Verify that abandoned wiring and equipment serve only abandoned facilities.
C. Demolition Drawings are based on casual field observation and existing record documents. Contractor may purchase a copy of existing record documents for reference during bidding or construction. Report discrepancies to Architect/Engineer before disturbing existing installation. Verify existing conditions before performing any work.
D. Beginning of demolition means installer accepts existing conditions.
E. Where work is concealed above ceiling spaces which are to be removed, cut opening in ceiling and examine condition above the ceiling. If work requires certain devices to remain and the ceiling is supporting the device, contractor shall support device adequately from floor slab above, prior to ceiling demolition or at his option, remove the device and reinstall completely.
F. Contractor shall verify existing circuit feeding each receptacle in demolition and remodeled area and document in the panelboard directory on record drawings. Contractor shall identify to Architect/ Engineer any wiring in poor condition or overload condition which exists.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
C. Existing Electrical Service: Maintain existing system in service until new system is ready for installation. Obtain permission from Owner at least 15 working days before completely disabling system. If outage lasts more than 24 hours, Contractor shall provide and install a generator for temporary service. Temporary service shall be provided until new service is in operation. Refer to Division 1 for temporary power. Make temporary connections to maintain service in areas adjacent to work area while switchovers are completed.
D. Existing Fire Alarm System: Maintain existing system in service until new system is complete. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 24 hours before partially or completely disabling system. Minimize outage duration. - Make connections to maintain service in existing areas not to be remodeled.

E. Existing central intercom/speaker systems: Maintain existing system in service until work is complete. Disable system only to make switchover and connections. Notify Owner at least 24 hours before partially or completely disabling systems. Minimize outage durations. Make temporary connections to maintain service in areas adjacent to work area.
F. Existing Security/Camera System: Maintain existing system in service. Disable system only to make switchovers and connections. Notify Owner and Architect/Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make connection to maintain service in areas not to be remodeled.
G. Existing Suspended Ceiling System: Disconnect and remove light fixtures, fire alarm devices, speakers and conduit, etc. to facilitate demolition work.
H. Protect adjacent materials that are to remain. Install and maintain dust and noise barriers to keep dirt, dust and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.
I. Locate, identify, and protect electrical services passing through demolition areas and serving other areas outside the demolition limits. Maintain services to areas outside demolition lines. When services must be interrupted or relocated, install temporary and/or permanent services for affected areas. Services originating within demolition limits and serving areas outside demolition limits shall be maintained.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Demolish and extend existing electrical work under provisions of the General Requirement Specification Sections and this Section.
B. Remove, relocate, and extend existing installations to accommodate new construction.
C. Remove abandoned wiring to source of supply.
D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes to source of supply. Cut concealed conduit flush with walls and floors, and patch surfaces. Remove conduit within walls to be removed. Provide cap on abandoned conduits on each end. If the existing concealed conduits are in conflict with new work remove them.
E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
H. Disconnect and remove abandoned panelboard and distribution equipment.
I. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
J. Extend existing installations and provide alterations using acceptable materials and methods compatible with existing electrical installations and in accordance with the equipment manufacturers' recommendations.
K. Remove, demount, and disconnect existing electrical materials and equipment indicated to be moved and salvaged, and deliver materials and equipment to the location designated for storage. Salvaged material shall be stacked, boxed or crated in such a manner as to prevent damage.
L. Any existing circuits or equipment not shown on drawings and which are logically expected to be continued in service and which may be interrupted or disturbed during construction shall be reconnected in an approved manner. Check and maintain continuity for all existing devices/equipment to remain. In addition, any existing circuits or equipment which may require relocation or rerouting as a result of the work of this project shall be done by this Contractor with no additional compensation. Provide blank cover plates on empty outlets which are to remain.
M. Provide new lighting switch(es) so each lighting area affected by new work shall be controlled locally.

N. Provide code required disconnects to existing and relocated, equipment when affected by new work.
O. Where existing equipment, devices and fixtures are to remain but are affected by new work such as replacement of ductwork and piping, reconditioning of walls, ceilings, roofs and floors of re-laminating of counters, cabinets and casework, disconnect these items and add extension rings, clean and reinstall same in line with new walls, ceilings and surfaces. Note that certain work (such as replacement of piping, ductwork, etc.) may be outside the limit to direct renovation. Electrical contractor shall review drawings of other trades for such work and incorporate that in his scope of work. Provide all necessary materials and labor and rewire in accordance with present code requirements.
P. Owner shall have the option of selecting any or all of the items, including copper wiring, which are designated to be removed by the contractor as salvage for the Owner. Contractor shall remove such items with extreme care and return such items to the Owner. Any equipment which the Owner does not want will become the property of the contractor and promptly removed from the site.
Q. All cutting and patching, relocating of any equipment, lighting fixtures, conduit, piping, etc., necessary for any work under this contract will be by the respective contractors unless noted otherwise in the architectural sections.
R. Reference shall be given to Owner to keep any removed device, fixture or equipment. If Owner does not want to keep any of them, dispose them as required.
S. Ballasts manufactured prior to 1980 containing PCB's and lamps containing mercury shall be disposed of by a federal or state E.P.A. approved method and in accordance with specifications.
T. HID and fluorescent lamps containing mercury shall be disposed of by a federal or state E.P.A. approved method and in accordance with specifications.
U. Before disconnecting, verify with Owner removal or relocation of all existing devices/equipment. No additional cost will be permitted for lack of such verification.
V. All existing outlet, junction boxes, conduit and wire which is supported by the existing ceiling system will be re-supported to the building construction. New wiring and outlets will be supported from the building construction.
W. This contractor shall coordinate all his work with the other contractors at the job site before removing existing electrical and installing new items.
X. Equipment removal in certain locations may require the installation of a junction box to reconnect circuits that remain in operation. Extend conduit and wiring as required to maintain power to remaining equipment.
Y. It is the intent of the electrical demolition drawing(s) to indicate areas in which electrical equipment, conduit, lighting fixtures, devices, etc. are to be removed to allow for the renovation phase of construction. The electrical demolition plan is for reference purposes only and it is not intended to be the sole source of existing conditions.
Z. Electrical Contractor shall be responsible for his own clean-up throughout the course of the demolition work. In the event he fails to provide such clean-up the Architect/Engineer will direct the clean-up to be performed by another contractor and the electrical contractor will be back-charged as deemed appropriate by Architect/Engineer.
AA. The contractor performing the demolition work, shall remove no more than 8" of building material around each device being demolished.
BB. Disconnect all electrical connections to mechanical, plumbing and architectural equipment for removal by others. Remove all starters, disconnect switches and related conduit and wiring serving such equipment which is indicated to be removed. Refer to mechanical, plumbing and architectural drawings for exact requirements.
CC. It shall be the contractor's option to reuse existing concealed conduit and flush mounted backboxes where applicable. If existing conduit and/or backboxes are utilized it shall be the electrical contractor's responsibility to provide additional supports and fittings required to conform to the specification.
DD. Remove all exposed abandoned and exposed non-required conduits together with their associated wires. Remove inaccessible conduits together with all their wires if they are in conflict with renovation work.

3.4 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.
B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised, existing circuiting arrangement and room numbers served.
C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts, and broken electrical parts.
D. Cabinets and Cover Plates: Where existing cabinets and cover plates are to be used for installation of new panelboard interiors, contractor shall clean exposed surfaces and paint area near cabinet and cover plates, removed from panelboard, to match existing condition. Contractor shall replace cabinet or cover plate, if necessary, to accommodate new work.

3.5 FLOOR AND WALL OPENINGS

A. Opening through floors and walls where piping or equipment has been removed shall be sealed to maintain any fire ratings and to seal off cold, smoke and toxic fumes. Use appropriate sealing materials and methods to maintain existing rating of the floor and wall.

3.6 DAMAGE TO OTHER WORK

A. The Contractor shall be held responsible for any damage caused to existing installations not pertinent to the Contract. The cost of repairs to such damaged work shall be charged against the Contractor.

3.7 CLEAN-UP

A. On completion of work of this section and after removal of all debris, site shall be left in clean condition satisfactory to the Construction Manager. Clean-up shall include off the premises disposal of all items and materials not required to remain the property of the Contractor as well as all debris and rubbish resulting from demolition operations.
B. Debris, including brick, asphalt, concrete, stone and similar materials shall become property of Contractor and shall be disposed of by the Contractor, off the property. Remove concrete foundations, conduits, anchor bolts, and all appurtenances.

3.8 INSTALLATION

A. Install relocated materials and equipment under the provisions of the General Requirement Specification Sections.

END OF SECTION

SECTION 16111

CONDUIT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirement Specification Sections, 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 SECTION INCLUDES
A. Metal conduit.
B. Flexible metal conduit.
C. Electrical metallic tubing.
D. Fittings and conduit bodies.

1.3 RELATED SECTIONS
A. Section 16130 - Boxes.
B. Section 16190 - Supporting Devices.
C. Section 16195 - Electrical Identification.

1.4 REFERENCES
A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
D. Local Electrical Code.
E. NECA "Standard of Installation."
F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
G. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.5 SUBMITTALS
A. Submit under provisions of the General Requirement Specification Sections and Section 16010.
B. Product Data: Provide for metallic conduit, flexible metal conduit, liquid-tight flexible metal conduit, metallic tubing, nonmetallic conduit, fittings, and conduit bodies.
C. Project Record Documents: Accurately record actual routing of conduits 1 1/4-inches and larger.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years' experience.

1.7 REGULATORY REQUIREMENTS
A. Conform to requirements of local electrical code.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 COORDINATION
A. Coordinate under provisions of the General Requirement Specification Sections.
B. Design Requirements: Conduit Size per local electrical code.
C. Field Measurements: Verify that field measurements are as shown on Drawings.
D. Field Locations: Verify routing and termination locations of conduit prior to rough in.
E. Where conduit routing is shown on Drawings, it is in approximate locations unless dimensioned. Include conduit lengths within 10 ft of length where shown.
F. Where conduit destination is indicated and routing is not shown on Drawings, determine exact routing and lengths required.

1.9 DELIVERY, STORAGE, PROTECTION, AND HANDLING

A. Accept Products and inspect for damage.
B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
C. Protect PVC conduit from sunlight.
D. Conduit that shows corrosion within the guarantee period shall be replaced.

PART 2 - PRODUCTS

2.1 CONDUIT SCHEDULE

A.

Conduit Location	From V up thru 50V -	Above 50V up thru 250V -	Above 250V up thru 600V - -
Above an Accessible Ceiling	≤ 2 1/2"EMT ≥ 3" IMC	≤ 2 1/2" EMT ≥ 3" IMC	≤ 2 1/2" EMT ≥ 3" IMC
Concealed in Walls	≤ 2 1/2"EMT ≥ 3" IMC	≤ 2 1/2"EMT ≥ 3" IMC	≤ 2 1/2"EMT ≥ 3" IMC
Exposed Interior	≤ 2 1/2"EMT ≥ 3" IMC	≤ 2 1/2" EMT ≥ 3" IMC	≤ 2 1/2" EMT ≥ 3" IMC

* All voltages are line-to-line or line-to-neutral.

2.2 CONDUIT REQUIREMENTS

A. Minimum Size: ¾-inch. All remaining conduits shall be minimum of ¾-inch including conduits for telephone, data, any other control, intercom device, etc.
B. Flexible conduit connections to recessed lighting fixtures shall be made with UL approved flexible steel conduit, except where UL listed liquid tight flexible conduit is required by code, such as in air plenums, etc.
C. Final connections to motors shall be made through UL listed liquid tight flexible steel conduits, ½-inch minimum size unless otherwise indicated.
D. Flexible connections, where required, shall be made with flexible metallic tubing ¾-inch minimum size or sized in accordance with code, except in areas where such connections will be exposed to oil, grease, water, or where installed out of doors. In those areas of adverse exposure, flexible connections shall be made with UL listed liquid tight flexible steel conduit. Grounding conductors with green colored insulation shall be extended through all flexible connections including fixture "whips" and fastened to terminals within the first junction boxes on either side of the flexible length. Refer to Section 16510 for flexible connections to lighting fixtures

2.3 METAL CONDUIT

A. Manufacturers:
   1. Allied.
   2. LTV/Republic.
   3. Steelduct.
   4. Wheatland.
B. Rigid Steel Conduit: ANSI C80.1; hot dipped galvanized or electro-galvanized steel.
C. Intermediate Metal Conduit (IMC): Rigid steel.
D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel fittings of threaded joints.

2.4 FLEXIBLE METAL CONDUIT

A. Description: Interlocked galvanized steel construction.
B. Fittings: ANSI/NEMA FB 1; steel or malleable iron.
C. Minimum Size: 1/2-inch (13 mm), unless otherwise specified.

2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied.
   2. LTV/Republic.
   3. Steelduct.
   4. Wheatland.
B. Description: ANSI C80.3; hot dipped or electro-galvanized tubing.

2.6 EMT FITTINGS AND CONDUIT BODIES

A. Manufacturers:
   1. Appleton.
   2. OZ/Gedney.
   3. Raco.
   4. Steel City.
   5. T&B
B. Description: ANSI/NEMA FB 1; steel or malleable iron, compression type with insulated throat.
   1. Set-screw type fittings are not acceptable.
   2. Die-cast fittings of pot metal are not acceptable.

2.7 EXPANSION FITTINGS

A. Provide a suitable expansion fitting in each concealed or exposed electrical raceway crossing a building expansion joint. Fittings shall be complete with bonding jumper and clamps.
B. Manufacturers: OZ/Gedney, Crouse-Hinds and Appleton.

2.8 BUSHINGS

A. Bushings for conduits 1-inch and smaller shall be self-extinguishing thermoplastic grounding type – 150 degrees C. and insulating type.
B. Bushings for conduits 1¼-inch and larger shall be malleable iron body with 150-degree C. insulating ring and shall be grounding type. Insulating material shall be locked in place and non-removable.

PART 3 - EXECUTION

3.1 INSTALLATION - CONDUIT

A. Install conduit in accordance with NECA "Standard of Installation."
B. Install nonmetallic conduit in accordance with manufacturer's instructions.
C. Arrange conduit to maintain headroom and present neat appearance.
D. Route conduit parallel and perpendicular to walls.
E. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

F. Route conduit in and under slab from point to point.
G. Maintain adequate clearance, minimum of 12-inches, between conduit and piping.
H. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
I. Cut conduit square using saw or pipe cutter; de burr cut ends.
J. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate bends in metal conduit larger than 2-inch size, or provide factory elbows.
K. Provide suitable pull string in each empty conduit except sleeves and nipples.
L. Ground and bond conduit under provisions of Section 16170.
M. Identify conduit under provisions of Section 16195.
N. In general, conduits shall be run concealed. Where exposed conduit runs are shown or required, they shall be run parallel to building construction and shall be suitably supported at required intervals.
O. Conduits run to and from cabinets shall be run neatly, in accurate manner, and shall emerge from the floors and ceilings at right angles thereto.
P. Conduit stub ups and stub downs shall be arranged in a neat and orderly manner and shall emerge at right angles to floors or ceilings.
Q. In equipment spaces, such as fan rooms, plenums, etc., conduits and outlets may be exposed, but shall avoid interference with ventilating ducts, piping, etc.
R. Exposed conduit installed on or adjacent to ventilating ducts shall be installed after the ducts are in place and shall be run from ceiling or wall junction boxes in such manner as to retain accessibility to junction box covers and to permit future removal or replacement of ducts.
S. Non-metallic conduit changes of direction shall be made by use of large radius bends, sweeps, or offsets.
T. Steel conduit bends of same size as the non-metallic conduit shall be used to terminate non-metallic conduit underground runs above ground.

3.2 INSTALLATION - FITTINGS

A. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
B. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
C. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
D. Provide conduit seals for conduits and ducts entering/exiting hazardous locations.
E. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints and in each uninterrupted run of horizontal or vertical conduit in excess of 100 feet. Fittings shall be complete with bonding jumpers and clamps.
F. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
G. Double locknuts shall be used at termination of IMC and HWG conduit in knock out openings.
H. Ends of conduits shall be equipped with insulating bushings for 1-inch and smaller and insulated metallic bushings for 1¼-inches and larger. Ends of conduit shall be temporarily capped prior to installation and during construction to exclude foreign material.
I. Joints in conduit run underground or in slabs on ground shall be made watertight with copper base anti corrosive conductive compound.
J. Provide wall flanges and gasketing on conduits entering fan housings to minimize air leakage at points of penetration of housing.
K. No running threads shall be cut or used.
L. Transitions between non-metallic and steel conduit shall be made by means of conduit manufacturer's standard adapters.

3.3 INSTALLATION - SUPPORTS

A. Arrange supports to prevent misalignment during wiring installation.
B. Conduit embedded in underground concrete shall be adequately supported to prevent movement during concrete placement. Compact gravel fill and soil below underground conduit or support conduit with suitable separators and chairs prior to placing concrete.
C. Support conduit using coated steel or malleable iron straps, lay in adjustable hangers, clevis hangers, and split hangers.
D. Group related conduits; support using conduit rack. Construct rack using steel channel.
E. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.
F. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports
G. Do not attach conduit to ceiling support wires.
H. Bring conduit to shoulder of fittings; fasten securely.
I. Conduit risers shall be rigidly supported on the building structure, using appropriate supports only.
J. Installation of conduit in concrete structure shall conform to the requirements of ACI 318.
K. Sizes and spacing of conduits run in concrete shall be reviewed by the Architect/Engineer. Conduit shall not be reactive with the concrete. Conduit shall not cross-over one another.
L. Conduits and other electrical items shall not be fastened to or supported from ventilating ducts but shall be separately supported. The method of supporting and details of the supporting members shall be reviewed by the Architect/Engineer. In no case shall screws penetrate the sheet metal of the ducts.
M. Exposed conduits run on surfaces shall be supported according to code and within 3 feet of each outlet, junction box, or cabinet, by galvanized malleable conduit clamps and clamp backs. Suspended conduits shall be supported every 5 feet by conduit hangers and round rods, or where 2 or more conduits are run parallel, by trapeze hangers suitably braced to prevent swaying.
N. Screws for exposed work shall be stainless steel.
O. Cadmium plated steel screws may be used for interior unexposed dry locations only.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of the General Requirements.
B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pipe portals. Coordinate location with roofing installation.

END OF SECTION

SECTION 16112

SURFACE RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirements, 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 SECTION INCLUDES
A. Surface metal raceways.
B. Multi outlet assemblies.
C. Wireways.

1.3 RELATED SECTIONS
A. Section 16140 - Wiring Devices: Receptacles.

1.4 REFERENCES
A. NECA (National Electrical Contractors Association) Standard of Installation.
B. NEMA WD 6 - Wiring Device Configurations.

1.5 SUBMITTALS
A. Submit under provisions of the General Requirements and Section and 16010.
B. Product Data: Provide for surface metal raceways, multi-outlet assemblies, wireways, finishes, and accessories.
C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
D. Project Record Documents: Record actual locations of surface raceway and record actual circuiting arrangements in project record documents.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years’ experience.

1.7 REGULATORY REQUIREMENTS
A. Conform to requirements of local electrical code, unless otherwise specified.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 COORDINATION
A. Coordinate under provisions of the General Requirements and Section 16010.
B. Field Meetings: Coordinate within pre-installation meeting.
C. Field Measurements: Verify that field measurements are as shown on Drawings.

PART 2 - PRODUCTS

2.1 SURFACE METAL RACEWAY
A. Manufacturers:
   1. Wiremold (Basis of Design)
   2. Mono-Systems
   3. Hubbell
   4. Pre-approved equal
B. Description: Steel channel with fitted cover, suitable for use as surface metal raceway.
C. Size: V700 (minimum)

D. Finish: Buff enamel
E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories.

2.2 WIREWAY

A. Manufacturers:
   1. Wiremold, or equal
B. Description: General purpose type wireway.
C. Knockouts: Manufacturer's standard.
D. Size: As required to accommodate number of wires.
E. Cover: Screw cover.
F. Connector: Flanged.
G. Fittings: Lay in type with removable top, bottom, and side; captive screws.
H. Finish: Rust inhibiting primer coating with gray enamel finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.
B. Use flat head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.
C. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
D. Wireway Supports: Provide steel channel.
E. Close ends of wireway and unused conduit openings.
F. Ground and bond raceway and wireway.

END OF SECTION

SECTION 16123

BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions of the Contract, including Conditions of the Contract and Division 1 Specification Sections, 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 SECTION INCLUDES

A. Building wire and cable.
B. Wiring connectors and connections.

1.3 REFERENCES

A. NECA Standard of Installation (National Electrical Contractors Association).
B. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association).
C. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. Submit under provisions of the General Requirement Specification Sections and Section 16010.
B. Product Data: Provide for each cable assembly type.
C. Test Reports: Indicate procedures and values obtained.
D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.
E. Project Record Documents: Record actual locations of components and circuits.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years’ experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of local electrical code, unless otherwise specified.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 COORDINATION

A. Coordinate under provisions of the General Requirement Specification Sections and Section 16010.
B. Field Measurements: Verify that field measurements are as shown on Drawings.
C. Where wire and cable routing are shown on Drawings, it is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length where shown.
D. Where wire and cable destination are indicated and routing is not shown on Drawings, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:
   1. American Insulated Wire Corp.
   2. Cerro.
   3. Collyer.
   4. Capitol Wire and Cable.
   5. Okonite.
   6. Senetor.
   7. South Wire.
   8. Triangle.

B. Description: Single conductor insulated copper wire.
   1. AWG No. 12 minimum, unless otherwise specified.
   2. AWG No. 10 and smaller may be solid or stranded, unless otherwise specified.
   3. AWG No. 8 and larger shall be stranded.
   4. AWG No. 14 stranded, for control and signal wire only, unless otherwise specified.
   5. Provide wire and cable suitable for the temperature, conditions and location where indicated.
   6. Conductivity: Copper conductors shall have a conductivity of not less than 98% at 20□C (68□F). Conductor resistance values shall be in accordance with the values in NEMA WC 8.
   7. Jackets: Factory-applied nylon or PVC external jacketed wires and cables for pulls in raceways over 100-feet in length, for pulls in raceways with more than three equivalent 90° bends, for pulls in conduits underground or under slabs on grade, and where indicated.

C. Insulation: 600 volts NFPA 70 Types as follows:

1 Wire Location	Line/Load terminations on OCP devices rated from 15A thru 600A	Line/Load Terminations on 100% rated OCP devices
Interior Locations	THHN/THWN XHHW	<45°C ambient XHHW >45°C ambient

2.2 WIRING CONNECTORS

A. Solderless Insulated Mechanical Connectors:
   1. Manufacturers:
      a. Burndy DUC.
      b. Dossert GTC.
      c. OZ/Gedney XTPC.
      d. Thomas & Betts CTC.
   2. Provide parallel clamp connector with insulating cover.
   3. Connector shall be constructed of an all copper alloy with bolted tangential plates which will receive the clamping pressure and redistribute the pressure uniformly over the entire surface of the clamping mechanism.
   4. Insulating cover shall be of the same manufacturer as the connectors and shall have cable openings suitable for the cable insulation being installed. Where insulating covers do not completely seal taps, tape the installation. The insulating cover shall not kink or crimp the cable insulation when cover is completely closed.

B. Spring Wire Connectors:
   1. Manufacturers:
      a. Thomas & Betts PT.
      b. 3M Scotchloc.
C. Compression Connectors:
   1. Manufacturers:
      a. Burndy Hydent.
      b. Thomas & Betts 54000.
   2. One-hole lugs for AWG No. 4/0 and smaller.
   3. Two-hole lugs for AWG No. 250 kcmil and larger.
   4. Feeders 1200 Amps and larger shall include cable limiter type lugs at each end of each phase conductor.

2.3 ADDITIONAL ACCESSORIES

A. In the event that conduit and wire sizes increase beyond the motor or equipment manufacturer's normal provisions for conduit and wire terminations, due to voltage-drop or other considerations in motor branch-circuit designs, provide necessary auxiliary termination facilities with adequate boxes, lugs, terminals, and other components as may be required. Consult with the suppliers of motors and other items to ensure that the equipment is furnished with suitable components to accept the required conduits and wires.
B. Riser cables shall have cable supports as required by code.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.
B. Verify that raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

A. Route wire and cable as required to meet Project Conditions.
B. Install cable in accordance with the NECA "Standard of Installation."
C. Pull all conductors into raceway at same time.
D. Use pulling means including fish tape, cable, rope and basket weave wire/cable grips which will not damage cables or raceways.
E. Feeders shall be installed as continuous conductors without splices whenever possible. Where feeder splices are required, the contractor shall submit a request for approval in writing to the engineer indicating the feeder and splice location. Where splices are installed without written approval, the engineer reserves the right to have the contractor replace the spliced conductors with continuous conductors at no additional cost to the Owner.
F. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
   1. Cable lubricants shall be less than 6 percent solid residue after drying for 24 hours at 105°C. Cable lubricants shall not contain any waxes, greases, polyakylene glycol oils, or silicones. Manufacturer: Polywater J by American Polywater Corp.
G. Protect exposed cable from damage. Install exposed cable, parallel and perpendicular to surfaces, or exposed structural members, and follow surface contours, where possible.
H. Support signal cables above accessible ceiling, using cable ties to support cables from structure. Do not rest cable on ceiling grid.
I. Use suitable cable fittings, connectors, and supports.
   1. Cable supports shall be as required by Code and shall be compatible with the wire and cable type and the associated conduit size.
      a. Manufacturer: OZ/Gedney or Thomas & Betts.

J. Increase conductor size as required due to availability. Minimum feeder conductor sizes are shown on Drawings. If increased, be responsible for associated feeder conduit size and increased ground conductor size per NEC.
K. Provide conductors of the same size from the protective device to the last load.
L. Make conductor length identical for parallel feeders.
M. Support conductors in vertical raceways. One cable support shall be provided at the top or as close to the top as practical, plus a support for each additional interval of spacing per Table 300-19a of the NEC.
N. Provide slack wire for all future connections with ends of wires taped and blank box covers installed.
O. Do not bend cables, either permanently or temporarily during installation, to radii less than that recommended by the manufacturer.
P. Use conductors with 90□C insulation when wiring is within seven feet of, passing over or attached to the following:
    1. Boilers.
    2. Hot water heaters.
    3. Other heat producing equipment.
Q. Neatly train and lace wiring inside boxes, equipment, and panelboards.
R. Splices, Taps and Terminations
    1. Make splices and taps in wiring #10 AWG and smaller mechanically and electrically secure with mechanical pressure type splicing devices.
    2. Make splices and taps of conductors #8 AWG or larger and all splices in motor terminal boxes using compression connectors requiring the use of compression tools for securing the conductors in the connectors. Termination of conductors at all distribution equipment, except transformers, shall be made using mechanical lugs. Connectors shall be of high conductivity, corrosion-resistant material and have actual contact area that shall provide at least the current carrying capacity of the wire or cable. For conductors #1/0 and larger, connector lugs shall be of the two-hole type. Connector lugs shall be bolted to bussing using Belleville washers in combination with flat washers and nuts.
    3. Each conductor lug or bus shall be individually made with separate lug and/or bolt as required for the termination.
    4. Provide insulated connectors for splices and taps with a self-fusing rubber insulating tape that is non-corrosive to the connector and the conductor. Insulation tape shall have a minimum of 350 volts per mil dielectric strength. Friction or vinyl tape shall be applied directly over rubber insulating tape equal to 3M Scotch 88 type.
S. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torqueing requirements are not indicated, tighten connector and terminals to comply with tightening torques specified in UL Standards 486A and B.
T. Identify and color code wire and cable under provisions of Section 260553. Identify each conductor with its circuit number or other designation indicated. Wire color coding shall be as follows or as required by local codes:

Normal Power

120/208 Volts:	277/480 Volts:
Phase A – Black	Phase A – Brown
Phase B – Red	Phase B – Orange
Phase C – Blue	Phase C – Yellow
Neutral – White	Neutral – Gray
Ground – Green	Ground – Green

3.4 MAXIMUM BRANCH CIRCUIT LENGTHS

A. The following indicates maximum installed length a circuit can have and still maintain an adequate voltage level at the last point of use for 20-amp circuit. If the 20-amp circuit length exceeds the length listed, use the next larger wire sized. Multiple circuit runs in the same raceway shall have all conductors sized the same based on worst case circuit lengths.

BRANCH CIRCUIT LENGTH (IN FEET)

Wire Size	2 Wire 120 V	2 Wire 277 V	1 Phase 208V	1 Phase 480 V	3 Phase 208 V	3 Phase 480 Volt
12	0 to 61'	0 to 141'	0 to 105'	0 to 244'	0 to 122'	0 to 282'
10	62' to 97'	142' to 224'	106' to 168'	245' to 388'	123' to 194'	283' to 449'
8	98' to 154'	225' to 357'	169' to 267'	389' to 618'	195' to 309'	450' to 714'
6	155' to 246'	358' to 567'	268' to 426'	619' to 983'	310' to 491'	715' to 1135'

3.5 FIELD QUALITY CONTROL

A. Testing: Upon installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
   1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification, Section 7.3.1. Certify compliance with test parameters.
B. Correct malfunctioning products at site, where possible, and retest to demonstrate compliance; otherwise remove and replace with new units, and retest.
C. Inspection: Inspect wire and cable for physical damage and proper connection.
D. Insulation Resistance Test: Prior to energization of circuitry, check installed wires and cables with megaohm meter to ensure insulation resistance requirements are fulfilled.
E. Continuity Test: Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections. Correct if necessary.
F. Branch Circuits with Receptacles: Branch circuit receptacle wiring shall be tested using a Daniel Woodhead Co. circuit tester Model #1750.
G. Torque Test: Torque test conductor connections and terminations to manufacturer’s recommended

END OF SECTION

SECTION 16130

BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirement Specification Sections, 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 SECTION INCLUDES
A. Wall and ceiling outlet boxes.
B. Pull and junction boxes.

1.3 RELATED SECTIONS
A. Section 16140 - Wiring Devices.
B. Section 16190 - Supporting Devices.

1.4 REFERENCES
A. NECA (National Electrical Contractors' Association) Standard of Installation.
B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
C. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
E. Local electrical code.

1.5 SUBMITTALS
A. Submit under provisions of General Requirement Specification Sections and Sections 16010.
B. Product Data: Provide for outlet boxes and floor boxes.
C. Project Record Documents: Record actual locations and mounting heights of outlet boxes, floor boxes, junction boxes, and pull boxes.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years' experience.

1.7 REGULATORY REQUIREMENTS
A. Conform to requirements of local electrical code.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 COORDINATION
A. Coordinate under provisions of the General Requirement Specification Sections and Section 16010.
B. Field Measurements: Verify that field measurements are as shown on Drawings.
C. Field Locations: Verify locations of boxes prior to installation.

PART 2 - PRODUCTS

2.1 OUTLET BOXES
A. Manufacturers:
   1. Appleton
   2. Raco
   3. Steel City
B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel with knockouts.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include ½-inch male fixture studs where required.
   2. Concrete Ceiling Boxes: Concrete type.

C. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover and threaded hubs.
D. Wall Plates for Finished Areas: As specified in Section 16140.

2.2 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1.
   1. Material: Hot-dipped galvanized steel.
   2. Covers: Secured with stainless steel screws.
   3. Finish: Paint interior and exterior with rust-inhibitive paint.
   4. Gaskets: Provide in accordance with applicable Code.
B. Hinged Enclosures: As specified.
C. Surface Mounted Cast Metal Box: NEMA 250, flat flanged, surface mounted junction box:
   1. Material: Galvanized cast iron.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless-steel cover screws.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations and mounting heights of floor boxes and outlets prior to rough in.

3.2 INSTALLATION

A. Install boxes in accordance with NECA "Standard of Installation."
B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
E. Box sizes shall not be smaller than that required by Code for the number and size of wires and/or conduits to be installed.
F. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.
G. Maintain headroom and present neat mechanical appearance.
H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
J. Plenum Ceiling Areas: Install boxes in accordance with applicable Code.
K. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in the General Requirements.
L. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
M. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
N. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
O. Outlet boxes for toggle switches shall be located on the strike side of the door.
P. Use flush mounting outlet box in finished areas.
Q. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
R. Do not install flush mounting box back to back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
S. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
T. Use stamped steel bridges to fasten flush mounting outlet box between studs.
U. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
V. Use adjustable steel channel fasteners for hung ceiling outlet box.
W. Do not fasten boxes to ceiling support wires.
X. Support boxes independently of conduit.

Y. Use gang box where more than one device is mounted together. Do not use sectional box.
Z. Use gang box with plaster ring for single device outlets.
AA. Use cast outlet box in exterior locations and wet locations.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Coordinate installation of outlet box for equipment connected under Section 16180.

3.4 ADJUSTING

A. Adjust installed work under the provisions of the General Requirements.
B. Adjust flush mounting outlets to make front flush with finished wall material.
C. Install knockout closures in unused box openings.

3.5 CLEANING

A. Clean installed work under the provisions of the General Requirements Specification Sections.
B. Clean interior of boxes to remove dust, debris, and other material.
C. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirement Specification Sections, 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 SECTION INCLUDES
A. Wall switches.
B. Device plates and decorative box covers.

1.3 RELATED SECTIONS
A. Section 16130 - Boxes.

1.4 REFERENCES
A. NECA - (National Electrical Contractors Association) Standard of Installation.
B. NEMA WD 1 - General Requirements for Wiring Devices.
C. NEMA WD 6 - Wiring Device Dimensional Requirements.
D. NFPA 70 – National Electrical Code.

1.5 SUBMITTALS
A. Submit under provisions of the General Requirements and Section 16010.
B. Product Data: Provide for wiring devices, device plates, and fittings. Include manufacturer's catalog information showing dimensions, colors, and configurations.
C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
D. Project Record Documents: Record actual locations of devices and record actual circuiting arrangements in project record documents.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years’ experience.

1.7 REGULATORY REQUIREMENTS
A. Conform to requirements of local electrical code, unless otherwise specified.
B. Furnish Products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 COORDINATION
A. Coordinate under provisions of the General Requirements and Section 16010.

PART 2 - PRODUCTS

2.1 WALL SWITCHES
A. Manufacturers:
   1. Pass and Seymour.
   2. Hubbel.
   3. Or Equal.

B. Specification Grade Toggle Style: 20A., 120-277V., back and side wired.

	Pass and Seymour
1P	CS20AC1
2P	CSB20AC2
3W	CSB20AC3
4W	CSB20AC4
1P-K	PS20AC1-L
1P-PL	PS20AC1-RPL
3W-PL	PS20AC3-RPL

C. Legend: 1P=single-pole, 2P=double-pole, 3W=three-way, 4W=four-way, K=keyed, PL=pilot light, MC=momentary contact.
D. Color: Ivory or red, unless otherwise specified. Final color selection shall be by the Architect.

2.2 WALL PLATES

A. Manufacture: Match switch and receptacle manufacture. Provide matching cover plates for switches and receptacles within same area, unless otherwise specified.
B. Standard Cover Plate: Brushed stainless steel.
C. Weatherproof Cover Plate: Gasketed corrosion resistant cast metal with hinged and gasketed device cover.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that device types, traditional or designer, finishes, and colors are in conformance with the Architects direction.
B. Verify that outlet boxes are installed at proper height.
C. Verify that outlet boxes for light switches are on strike side of door.
D. Verify that wall openings are neatly cut and will be completely covered by wall plates.
E. Verify that outlet boxes for wall dimmers are adequately sized to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
F. Verify that exterior, wet locations, and other locations required by authority having jurisdiction, are provided with GFI type devices.
G. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."
B. Install fittings in accordance with manufacturer’s instructions.
C. Install devices plumb and level.
D. Install switches with OFF position down.
E. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
F. Do not share neutral conductor on load side of dimmers.
G. Install receptacles with grounding pole on right side.
H. Connect wiring device grounding terminal to separate green branch circuit equipment grounding conductor.
I. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

J. Connect wiring devices by wrapping conductor around screw terminal.
K. Use jumbo size plates for outlets installed in masonry walls.
L. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
M. Install protective rings on active flush cover service fittings.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 16130 to obtain mounting heights as specified.
B. Coordinate the installation of wiring devices with furniture systems.

3.5 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of the General Requirements.
B. Inspect each wiring device for defects.
C. Operate each wall switch with circuit energized and verify proper operation.
D. Verify that each receptacle device is energized.
E. Test each receptacle device for proper polarity.
F. Test each GFI receptacle device for proper operation.

3.6 ADJUSTING

A. Adjust installed work under the provisions of the General Requirements.
B. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

A. Clean installed work under the provisions of the General Requirements.
B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 16150

OCCUPANCY SENSORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirement of 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 SECTION INCLUDES
A. Occupancy sensors.
B. Power pack.

1.3 RELATED SECTIONS
A. Section 16130 - Boxes.

1.4 REFERENCES
A. Underwriters Laboratories Inc. – UL508, UL916.
B. ISO 9001 Quality Standard
C. NOM Certification Mark
D. American National Standards Institute
E. Institute of Electrical and Electronic Engineers

1.5 SUBMITTALS
A. Submit manufacturer's standard catalog data giving all application, wiring, and installation information on basic components. Provide test data and/or samples as required to demonstrate conformance with PART 2 of this specification.
B. Submit a lighting plan clearly marked by manufacturer showing proper product, location and orientation of each sensor
C. Submit any interconnection diagrams per major subsystem showing proper wiring.
D. Shall include a load schedule which indicates the actual connected load and load type per circuit, circuits and their respective control zones, circuits that are on emergency (if applicable), and the capacity, phase, and corresponding circuit numbers (per the electrical drawings).
E. Shall include all exceptions taken to the Specification.

1.6 APPROVALS
A. Prior approval is required for alternate proposals. For pre-approval, provide all the information listed under Submittals a minimum of ten (10) working days prior to initial bid date.
B. Complete Catalog data, specifications, and technical information on alternate equipment must be furnished to the Architect and Owner at least ten business days in advance of the bid date.

1.7 QUALITY ASSURANCE
A. Manufacturer shall have a minimum of 10 years continuous experience with occupancy sensors.
B. Occupancy sensors shall be UL, CUL or NOM listed (where appropriate). Manufacturer shall provide evidence of compliance on request.
C. Manufacturer shall have their quality system registered to the ISO 9001 Quality Standard, including in-house engineering for all product design activities. Due to the exclusion of the Design Control element, ISO 9002 Registration is not acceptable.
D. All devices shall be covered by a minimum one-year warranty.

1.8 PROJECT/SITE CONDITIONS
A. Lighting controls shall operate in an ambient temperature range of 0°C (32°F) to 40°C (104°F) and less than 90% non-condensing relative humidity without the requirement of a regularly scheduled maintenance program.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Leviton (Basis of Design)
B. Hubbell
C. Sensor Switch
D. Watt Stopper

2.2 CEILING MOUNTED OCCUPANCY SENSOR

A. Leviton OSC10 – MOW.
B. Sensors and related relays shall be compatible with the specific lighting types controlled.
C. All sensors shall be of the same manufacturer, mixing brands of sensors is not acceptable.
D. All sensors and related equipment shall have a five-year warranty.
E. All sensors and control modules shall be listed by Underwriters Laboratories.
F. Sensor shall incorporate ultrasonic and infrared technologies in a single unit for corridor or rooms. For washroom and stair-only ultrasonic type sensor shall be used.
G. Sensor shall be Class 2, low voltage; capable of mounting in the ceiling for maximum coverage.
H. Sensor shall use internal microprocessor for motion signal analysis and automatic self-adjustment.
I. Sensor shall have automatic self-adjustment algorithm which adjusts timer and sensitivity settings to maximize performance and minimize energy usage.
J. Sensor shall have manual time-out adjustment from 8 minutes to 32 minutes and automatic time-out from 8 minutes to 100 minutes.
K. Sensor shall have test time-out setting of 8 seconds, with automatic return to 8 minutes after one hour if sensor is left in test mode.
L. Sensor's microprocessor shall automatically reduce either PIR or ultrasonic sensitivity in response to false on condition.
M. Sensor microprocessor will automatically monitor PIR background threshold signal level and makes corresponding sensitivity adjustments automatically.
N. Sensor microprocessor algorithm shall incorporate automatic adaptation to continuous airflow.
O. Infrared lens shall have 360-degree field of view. Two types of lens shall be available, standard and extra dense.
P. Sensor shall have a variety of mask inserts for PIR coverage rejection to prevent false tripping.
Q. Sensor shall have a rugged plastic housing, white in color.
R. Transducers shall be protected from tampering.
S. Sensor shall have manual adjustments for timer and sensitivities and override switches to force manual adjustment mode.
T. Sensor shall have adjustable sensitivity from 0% to 100% for both ultrasonic and infrared.
U. Controls shall be behind cover to resist tampering. All adjustments shall be accessible from the front of the sensor.
V. Sensor shall be available with a photocell adjustment from 20 to 3,000 Lux.
W. Sensor shall provide internal operating status and settings confirmation via LED motion lamp indicator.
X. Sensor shall have two (if 180 degree) or three (if 360 degree) real time LED motion indicators visible from the front of the unit: Red = Infrared; green = ultrasonic.
Y. Sensor shall be available with a set of form 1C isolated dry relay contacts for interfacing sensor to auxiliary systems. Relay shall provide common, normally open and normally closed connections.

2.3 WALL MOUNTED OCCUPANCY SENSOR

A. Leviton ODS10 – IDI.
B. Sensor shall utilize active ultrasonics to detect motion.
C. Sensor shall have two ultrasonic transmitters and one receiver, each 18mm in diameter, and shall operate at 32.768kHz.
D. Sensor shall incorporate an inrush current limiter circuit to protect the relay contacts.

E. Sensor shall utilize a dry relay contact for control of the lighting load.
F. Sensor shall have a time out adjustment from 8 seconds to 32 minutes. Timer shall be linear and controlled by a timer chip.
G. Sensor shall have automatic sensitivity adjustment and be microprocessor controlled.
H. Sensor shall have automatic gain setback to reduce the sensitivity after the sensor has turned off the lighting to prevent false tripping.
I. Sensor shall have transmitter control adjustments to prevent false tripping from hallway traffic.
J. Sensor shall have a 180-degree field of view, coverage up to 800 square feet, and shall detect six inches of hand movement towards the sensor at a distance of 22 feet. Sensor shall detect body motion towards the sensor at a distance of 32 feet.
K. Sensor shall operate at 120VAC and 277VAC.
L. Sensor shall have automatic on/off controls and also a manual override switch to disconnect power to the lighting load.
M. Sensor shall have a real time motion indicator on the front of the unit.
N. Sensor shall mount to a single or double gang switch box.
O. Sensor shall have a high-impact injection molded housing.
P. Sensor shall be available with a second isolated dry relay for control of a second circuit. Relay shall be rated for 600 watts at 120VAC and 1400 watts at 277VAC. Applications shall include restroom fans.
Q. Sensor for restroom application shall be tamper resistant, incorporation a recessed automatic to off switch.

2.4 OCCUPANCY SENSOR POWER/CONTROL PACK

A. LEVITON OSP20 – DO.
B. Control module shall consist of a DC power supply and a dry contact relay for switching a lighting load.
C. Control module shall be available in versions to accept 120, 230, 277 and 347VAC line voltages.
D. Output shall be 24VDC nominal, and shall be inherently safe, low voltage, limited power output (Class 2).
E. Output shall supply 100mA current, in addition to current consumed internally to operate internal relay.
F. Relay shall utilize normally open, silver alloy dry contacts, and shall be rated for a 20A ballast load at 120V, 230V, 277V and 347V.
G. Relay function shall not require more than 5 mA control current to operate.
H. Control module shall have line voltage wiring, consisting of input voltage and relay contact connections, exiting from one end, and low voltage DC connections, consisting of ground, power, and control wires, exiting from the other end.
I. Control module shall be sized to fit inside a standard 4” X 4” junction box.
J. Control module shall be equipped with a ½ “ EMT threaded male fitting on the line voltage end, such that it may be mounted to the outside of a junction box with the line voltage wiring internal to the box and the low voltage wiring external.

PART 3 - EXECUTION

3.1 INSTALLATION

A. It shall be the contractor’s responsibility to locate and aim sensory in the correct location required for a complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer’s recommendations. Rooms shall have (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.

B. Contractor shall furnish all equipment, labor, system setup and other services necessary for the proper installation of the products/system as indicated on the drawings and specified herein.
C. Devices shall be installed utilizing manufacturer's recommended application, wiring and installation instructions.
D. Proper judgment shall be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitation or interference of structural components. The contractor shall also provide at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem-solving diagnosis of the occupancy sensing devices and systems.

3.2 FIELD QUALITY CONTROL

A. Locate sensor such that it provides the best coverage.
B. Adjust settings per manufacturer's recommendations.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirement 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 SECTION INCLUDES
A. Conduit and equipment supports.
B. Anchors and fasteners.

1.3 REFERENCES
A. NECA - National Electrical Contractors Association.
B. National Electrical Code.

1.4 SUBMITTALS
A. Submit under provisions of the General Requirements and Section 16010.
B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.5 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years' experience.

1.6 REGULATORY REQUIREMENTS
A. Conform to requirements of local electrical code, unless otherwise specified.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 COORDINATION
A. Coordinate under provisions of the General Requirement Specification Sections and Section 16010.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS
A. Materials and Finishes: Provide adequate corrosion resistance.
B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products. Design of supports and methods of fastening to building structures shall be acceptable to the Architect/Engineer.
C. Anchors and Fasteners: For point of attachment weight of 100 pounds or less.
   1. Steel Structural Elements: Use beam clamps.
   2. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
   3. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.
   4. Solid Masonry Walls: Use expansion anchors and preset inserts.
   5. Sheet Metal: Use sheet metal screws.
   6. Wood Elements: Use wood screws.
D. Anchors and Fasteners: For point of attachment weight of 100 pounds or more, obtain direction and approval from Architect/Engineer.

2.2 STEEL CHANNEL

A. Manufacturer:
   1. B-Line.
   2. Unistrut.
   3. Allied.
B. Description: Galvanized steel with baked enamel finish.

2.3 VIBRATION ISOLATION

A. Suspended vibration producing equipment shall have spring elements in the hanger rods or isolation pads under the equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
D. Do not use ceiling system components for support.
E. Connections to vibration producing equipment shall be made with flexible conduit.
F. Obtain permission from Architect/Engineer before using spring steel clamps.
G. Obtain permission from Architect/Engineer before using powder actuated anchors.
H. Obtain permission from Architect/Engineer before drilling or cutting structural members.
I. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
J. Install surface mounted cabinets and panelboards with minimum of four anchors.
K. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
L. Support surface or pendant lighting fixtures:
   1. From an outlet box by means of an interposed metal strap, where weight is less than 5 pounds.
   2. From an outlet box by means of a hickey or other direct threaded connection, where weight is from 5 to 50 pounds.
   3. Directly from structural slab, deck, or framing member, where weight exceeds 50 pounds.
M. Provide cushioned, swivel type hangers with appropriate outlet boxes for pendant fixtures in mechanical areas. Such hangers shall have a support rating at least twice that of the load supported.
N. Exposed parts of hangers and supports shall be painted with one coat of rust inhibiting primer.
O. Equipment shall not be held in place by its own dead weight. Provide base anchor fasteners in each case.
P. Vertical raceway shall be supported with spring type hangers.

END OF SECTION

SECTION 16510

INTERIOR LUMINAIRES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The General Provisions of the Contract, including Conditions of the Contract and the General Requirement 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 SECTION INCLUDES
A. LED Interior luminaires, drivers and integral controls.
B. Exit signs.
C. Luminaire accessories.

1.3 RELATED SECTIONS
A. Section 16190 - Supporting Devices.

1.4 REFERENCES
A. NEMA WD 6 - Wiring Devices Dimensional Requirements.
B. NFPA 70 - National Electrical Code.
C. NFPA 101 - Life Safety Code.
D. IESNA LM-80-08 IESNA - Approved Method for Measuring Lumen Maintenance of LED Light Source.
E. IESNA TM-21-2011 - Projecting Long Term Lumen Maintenance of LED Light Sources.
F. UL 1310 and 8750 - Light Emitting Diode (LED) Equipment for use in Lighting Products.
G. IEC 61347-2-13 - Particular requirements for electronic control gear for LED modules.
H. IEC-62384 - DC or AC supplied electronic control gear for LED modules - performance requirements.
I. IEC 62386-101/102/207 - Digital addressable lighting interface (DALI).

1.5 SUBMITTALS
A. Submit under provisions of the General Requirement Specification Sections and Section 16010.
B. Product Data: Provide for each luminaire, ballast, and lamp. Include dimensions, ratings, and performance data. Data shall be submitted in order of Luminaire Number as identified on drawings.
C. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
D. Manufacturer’s Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
E. Project Record Documents: Record actual locations of luminaires and record actual circuiting arrangements in project record documents.
F. Maintenance Data: Submit manufacturer's operation and maintenance instructions for each product. Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS
A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 COORDINATION

A. Coordinate under provisions of the General Requirements and Section 16010.
B. Field Measurements: Verify that field measurements are as shown on Drawings.
C. Field Locations: Verify locations of luminaires prior to rough in.

1.9 DELIVERY, STORAGE, PROTECTION, AND HANDLING

A. Protect from moisture by using appropriate coverings. Store in dry interior locations.
B. Do not install until building is closed in and suitable temperature conditions are controlled.
C. Maintain suitable temperature and humidity conditions during and after installation of luminaires.

PART 2 - PRODUCTS

2.1 LUMINAIRES

A. Furnish Products as scheduled.
B. Luminaires for general illumination, emergency lighting, and exit lighting, shall be complete with all required accessories and attachments. Luminaires of the same type shall be of the same manufacturer.
C. Luminaires shall bear Underwriters Laboratories, Inc. label and shall be wired and installed in full compliance with applicable codes.
D. Luminaires shall be recessed, surface, or pendant type, as specified in fixture schedule, and shall include housings, lamp holders, lenses, reflectors, ballasts, lamps, mounting hardware, and other required accessories.
E. Recessed mounted luminaires shall be in compliance with local codes for plenum installation.
F. Enameled finishes shall be electrostatically applied and baked. Finish of fixtures shall be uniform in quality and appearance, durable, and free from defects.
G. Labels and inscriptions in luminaires shall be located in unobtrusive places so that they are not visible to occupants in the completed installation.
H. Plaster frames, angles, and channels for recessed luminaires shall be furnished under this section where required. Plaster frames shall be specifically constructed for the application by the manufacturer of the related luminaire.
I. Recessed incandescent luminaires shall have a thermal protective device within the luminaire housing.
J. Luminaire shall carry the lighting facts label, verified based on LM-85 test reports.

2.2 EXIT SIGNS

A. Furnish Products as scheduled and in compliance with applicable codes.
B. Description: Exit sign fixture.
C. Housing: Sheet steel.
D. Face: Translucent glass face with red letters on white background.
E. Letters: 6" high, with 3/4" stroke, minimum.
F. Directional Arrows: As indicated, with letters 4 1/2" high, 3/4" stroke, minimum.
G. Lamps: Light emitting diodes.
H. Electrical Connections: Conduit connection.
I. Indicators: Lamps to indicate AC-ON and RECHARGING.

2.3 LED LUMINAIRES

A. Each luminaire shall consist of an assembly that utilizes LED's as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this specification.
B. Each luminaire shall be designed to operate at an average operating temperature of 25□ C.
C. The operating temperature range shall be 0□ to + 25□C
D. Each luminaire shall meet all parameters of this specification throughout the minimum operation life of 50,000 hours when operated at the average operating temperature.

E. Nominal luminaire dimensions: as scheduled.
F. Luminaire Construction:
   1. Luminaire housing to have no visible welding, screws, springs, hooks, rivets, bare LED's or plastic supports.
   2. The luminaire shall be a single, self-contained device, not requiring on-site assembly for installation. The power supply and circuit board for the luminaire shall be integral to the unit.
   3. Luminaires shall be fabricated from post painted cold rolled steel and shall be a rigid structure with integral T-bar clips. Fixture may be mounted and wired in continuous rows.
   4. Finish: Polyester powder coat painted with 92% high-reflective paint after fabrication.
   5. Reflector: rugged one-piece cold rolled steel with linear facets to distribute soft light at multiple angles, without flashing thus reducing high luminance contrast.
   6. End caps shall be sloped at 70 degrees to create depth.
   7. Luminaire to have smooth transition between T-bar and reflector arch. No doorframe or exposed hardware.
   8. Lens shall be impact modified, single clear diffuser with advanced optical film and shall provide LED concealment and even illumination across the diffuser.
   9. Polymeric materials (if used) of enclosures containing either the power supply or electronic components of the luminaire shall be made of UL94VO flame retardant materials. Luminaire lenses are excluded from this requirement.
   10. Integral Grid Clips required on recessed mounted luminaires along with integral tie wire mounting points.
   11. Luminaire to have air removal capability as specified.
   12. The assembly and manufacturing process for the SSL luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration.
G. Led Sources
   1. LED's shall be manufactured by, Nichia, Samsung, LG or Osram.
   2. Lumen Output - minimum initial output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0-90-degree zone - as measured by IESNA Standard LM85 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
      a. Type 2x2-2425 (24 watts max.) or 3617 (36 watts max.) initial lumens @ 3500k per specification.
      b. Type 2x4 - 4026 (40 watts max.) or 4740 initial lumens (47 watts max.).
   3. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours.
   4. Individual LED's shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
   5. LED boards shall be suitable for field maintenance or service from below the ceiling with plug-in connectors. LED boards shall be upgradable.
   6. Light color/quantity:
      a. Correlated color temperature (CCT) range as per specification, between 3500K and 4100 K shall be correlated to chromaticity as defined by the absolute (X, Y) coordinates on the 2-D CIE chromaticity chart.
      b. Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM8- report.
      c. The color rendition index (CRI) shall be 80 or higher.
H. Power Supply and Driver
   1. Driver: Acceptable manufacturer: eldoLED or equal.
   2. Ten-year expected life while operating at maximum case temperature and 90% non-condensing relative humidity.
   3. Driver shall be UL recognized under the component program and shall be modular for simple field replacement. Drivers that do not meet these requirements will not be accepted.

4. Electrical characteristics: 120 - 277 volt, UL listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.
5. Dimming: Driver shall be suitable for full-range dimming. LED dimming shall be equal in range and quality to a commercial grade incandescent dimmer. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100 % to 1 % of rated lumen output with a smooth shut off function.
6. Dimming quality to be defined by dimming range, freedom from perceived flicker or visible strobscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, inaudible in 26db environment, and stable when input voltage conditions fluctuate over what is typically experienced in a commercial environment. Demonstration of this compliance to dimming performance will be necessary for substitutions or prior approval.
    a. Dimming shall be controlled by a 0-10V signal.
    b. Driver shall include ability to provide no light output when the analog control signal drops below 0.5 V, or the DALI/DMX digital signal calls for light to be extinguished and shall consume 0.5 watts or less in this standby. Control dead band between 0.5V and 0.65V shall be included to allow for voltage variation of incoming signal without causing noticeable variation in fixture to fixture output.
    c. Driver shall be capable of configuring a linear or logarithmic dimming curve, allowing fine grained resolution at low light levels.
    d. Driver must be capable of 20-bit dimming resolution for white light LED driver.
    e. Drivers shall track evenly across multiple fixtures at all levels and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range.
7. Flicker: Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100-0.1% luminaire shall have:
    a. Less than 1% flicker index at frequencies below 120 HZ.
    b. Less than 12% flicker index at 120 Hz and shall not increase at greater than 0.1% per Hz to a maximum of 80% flicker index at 800Hz.
8. Driver disconnect shall be provided where required to comply with codes.
9. The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements.
10. The surge protection which resides within the driver shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for location category A, where failure does not mean a momentary loss of light during the transient event.

I. Electrical

1. Power Consumption: Maximum power consumption, +/- 5% when operating between 120 - 277V shall be as follows:
    a. Type 2x2 - 24 or 36 W (100 Lumens per watt).
    b. Type 2x4 - 47W (100 Lumens per watt).
2. Operation Voltage - The luminaire shall operate from a 50 or 60 HZ □3 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output. The standard operating voltages are 120 VAC and 277 VAC.
3. Power factor: The luminaire shall have a per factor of 90% or greater at all standard operating voltages and full luminaire output.
4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20% at any standard input voltage and meet ANSI C82.11 maximum allowable THD requirements at full output. THD shall at no point in the dimming curve allow imbalance current to exceed full output THD.

5. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference. Withstand up to a 1,000-volt surge without impairment of performance as defined by ANSI C62.41 Category A.
6. In rush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 A2s.
7. RF Interference: The luminaire and associated on-board circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
8. Driver must support automatic adaptation, allowing for future luminaire upgrade and enhancements and deliver improved performance.
    a. Adjustment of forward LED voltage, supporting 3V through 60V.
    b. Adjustment of LED current from 200mA to 1.05A at the 100% control input point in increments of 1mA.
    c. Adjustments for operating hours to maintain constant lumens (within 5%) over the 50,000-hour design life of the system and deliver up to 20% energy savings early in the life cycle.
9. Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without removing the fixture from the ceiling.
10. All electrical components shall be RoHS compliant.

J. Photometric Requirements:
    1. Luminaire performance shall be tested as described herein.
        a. Luminaire performance shall be judged against the specified minimum illuminance in the specified pattern for a particular application.
        b. Luminaire lighting performance shall be adjusted (depreciated) for the minimum life expectancy (Section 2.2.4).
        c. The performance shall be adjusted (depreciated) by using the LED manufacturer's data from the IESNA Standard TM-21 test report, which ever one results in a higher level of lumen depreciation.
        d. The luminaire may be determined to be compliant photometrical, if:
            1) The initial minimum illuminance level is achieved in 100% of the area of the specified lighting pattern.
            2) The measurements shall be calibrated to standard photopic calibrations.

K. Thermal Management
    1. The thermal management (of the heat generated by the LED's) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life (Section 2.2.7 (c)).
    2. The LED manufacturer's maximum junction temperature for the expected life (Section 2.2.7 (c)) shall not be exceeded at the average operating ambient (Section 2.2.2).
    3. The LED manufacturer's maximum junction temperature for the catastrophic failure shall not be exceeded at the maximum operating ambient (Section 2.2.3).
    4. The luminaire shall have an UL IC rating.
    5. The driver manufacturer's maximum case temperature shall not be exceeded at the maximum operating ambient. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

L. Optics
    1. The optical assembly shall provide volumetric distribution to eliminate cave effect and provide uniform illumination in the space and increased luminance on vertical surfaces.
    2. Optics shall consist of a ribbed metal reflector system and extruded refracting optical lens with high-transmission internal optical film applied to the inside of the refracting lens. No individual LED images shall be visible to the occupant of the space.
    3. Refractor or lens shall be 2-piece assembly composed of impact-resistant (20%) DR acrylic with a polymer optical film.
    4. 2x2 and 2x4 luminaire shall have center optic and faceted reflector.

M. Integrated (Optional by manufacturer)
   1. Each luminaire may be equipped with two (2) digital RJ45 ports and interface with other digital control equipment.
   2. May connect to devices compatible with 0 to 10V Analog Control Protocol, Class 2, capable of sinking 0.6ma per driver at a low end of 0.3V. Limit the number of drivers on each 0-10V control output based on voltage drop and control capacity.
   3. May connect to digital (DALI Low Voltage Controlled) Dimming drivers.
   4. Must meet IEC 62386.
   5. May connect to digital multiplex (DMX Low Voltage Controlled) Dimming drivers.
   6. Must meet DMX/RDM: USITT DMX512A and ANSI E1.20 (Explore & Address).
   7. Lumen Management: The luminaire may be capable of continuously monitoring system performance to allow for constant lumen management/compensation function. Lumen output to be maintained at 80% for life of the luminaire, initial input to be 80% of rated input watts and climb to rated watts by end of rated life of luminaire.
   8. Each luminaire may be supplied with a unique network address. This address shall be printed on two identification labels. One label shall be permanently affixed to the luminaire and one label shall be easily removed for network control commissioning purposes. Both labels shall be in a location which is easily accessible by the installing contractor.
   9. Control Input:
      a. 4-Wire (0-10V DC Voltage Controlled) Dimming Driver:
         1) Must meet IEC 60929 Annex E for General White Lighting LED drivers.
         2) Must meet ESTA E1.3 for RGBW LED drivers.

N. Luminaire Identification
   1. Each luminaire shall have the manufacturer's name, trademark, model number, serial number, date of manufacturer (month-year), and lot number as identification permanently marked inside each unit and the outside of each packaging box.
   2. The following operating characteristics shall be permanently marked inside each unit: rated voltage and rated power in Watts and Volt-Ampere.

O. Quality Assurance
   1. The luminaires shall be manufactured in accordance with a manufacturer quality assurance (QU) program. The QA program shall include two types of quality assurance: (1) design quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification. These tests shall include: CCT, CRI, Lumen output and wattage. Tests shall be recorded, analyzed and maintained for future reference.
   2. QA process and test results documentation shall be kept on file for a minimum period of seven years.
   3. LED luminaire designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

P. Design Qualification Testing
   1. Design Qualification Testing shall be performed by a National Voluntary Laboratory Accreditation Program (NVLAP) testing facility. Such testing may be performed by the manufacturer or an independent testing lab hired by the manufacturer on new luminaire designs, and when a major design change has been implemented on an existing design. A major design change is defined as a design change (electrical or physical) which changes any of the performance characteristics of the luminaire, results in a different circuit configuration for the power supply, or changes the layout of the individual LED's in the module.
   2. A quantity of two units for each design shall be submitted for Design Qualification Testing.

3. Product submittals shall be accompanied by product specification sheets or other documentation that includes the designed parameters as detailed in this specification. These parameters include (but not limited to):
   a. Maximum power in Watts.
   b. L80 in hours, when extrapolated for the worse case operating temperature (section 2.2.3). TM21 report shall be submitted to demonstrate this.
   c. Product submittals shall be accompanied by performance data that is derived in accordance with appropriate IESNA testing standards and tested in a laboratory that is NVLAP accredited for Energy Efficient Lighting Products.
4. Luminaire shall be tested per IESNA LM85.

Q. WARRANTY
1. The manufacturer shall provide a warranty against loss of performance and defects in materials and workmanship for the Luminaires for a period of 5 years after acceptance of the Luminaires. Warranty shall cover all components comprising the luminaire. All warranty documentation shall be provided to customer prior to the first shipment.
2. Provide manufacturer's warranty covering 5 years on drivers from date of purchase. Refer to manufacturer's terms and conditions on the website for detailed information.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install suspended luminaires and exit signs directly from building structure using rigid stem pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
B. Support luminaires larger than 2'x 4' size independent of ceiling framing.
C. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
E. Grid Ceilings: Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.
F. Install recessed luminaires to permit removal from below.
G. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.
H. Install clips to secure recessed grid supported luminaires in compliance with applicable codes.
I. Install wall mounted luminaires and exit signs at height as shown.
J. Install accessories furnished with each luminaire.
K. Connect luminaires and exit signs to emergency power as indicated branch circuit under Section 16130 using flexible conduit, 3/8" minimum.
L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
   1. Recessed LED: AWG No. 14 RHH or THWN.
M. Bond products and metal accessories to branch circuit separate green equipment grounding conductor.
N. Install specified lamps in each luminaire and exit sign in accordance with manufactures instructions for handling and burning position.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Coordinate installation of recessed luminaire frames and trims with ceiling construction.
B. Coordinate the installation of suspended luminaires with building components, verify exact locations and mounting heights.

3.3 FIELD QUALITY CONTROL

A. The use of permanent luminaires for temporary lighting shall only be as permitted by the Architect/Engineer.
B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.4 ADJUSTING

A. Adjust installed work under provisions of the General Requirement Specification Sections.
B. Aim and adjust luminaires as indicated and as directed.
C. Position exit sign directional arrows as indicated.

3.5 CLEANING

A. Clean installed work under provisions of the General Requirement Specification Sections.
B. Clean electrical parts to remove conductive and deleterious materials.
C. Remove dirt and debris from enclosures.
D. Clean photometric control surfaces to remove all dust and smudges with cleaning solution as recommended by manufacturer.
E. Clean finishes and touch up damage.

3.6 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate installed work under provisions of the General Requirement Specification Sections.
B. Demonstrate luminaire operation for minimum of two hours.

3.7 PROTECTION OF FINISHED WORK

A. Protect installed work under provisions of the General Requirement Specification Sections.
B. Re-lamp luminaires used for temporary lighting and luminaires that have failed lamps at the time of project turn-over.

END OF SECTION

SECTION 17100

DIRECT DIGITAL CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1, 15 and 16 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Control equipment.
B. Software.
C. Instrument and control elements.

1.3 RELATED SECTIONS

A. Section 17600 - Sequence of Operation for HVAC controls.

1.4 REFERENCES

A. ASME MC85.1 - Terminology for Automatic Control.
B. NEMA EMC1 - Energy Management Systems Definitions.
C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
D. NFPA 70 - National Electrical Code.
E. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.

1.5 SYSTEM DESCRIPTION

A. Provide hardware and software as required to fully integrate and support extension to existing JCI Building Automation System. All control points listed in Section 17600 "Sequence of Operation for HVAC controls" shall be performed by the DDC system and displayed on the Operator Workstation. Any other control work required to complete the sequence of operation specified in Section 17600 may be electric or electronic. Contractor shall provide all transformers, sensors, switches, relays etc. necessary for a complete operating system.
B. Provide automatic temperature control field monitoring and control system using BACnet field programmable microprocessor-based units with communications to the existing Building Automation System.
C. Provide base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
D. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.
E. Provide control systems consisting of temperature sensors, thermostats, control valves, dampers, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
F. Furnish and install all power wiring and conduit necessary for the BAS control system for a complete operating system. Install per Division 16.
G. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

1.6 SUBMITTALS FOR REVIEW

A. See Division 1 Requirements.
B. Product Data: Provide data for each system component and software module.
C. Shop Drawings:
    1. List connected data points, including connected control unit and input device.
    2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.
    3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
    4. Indicate description and sequence of operation of operating, user, and application software.
    5. Ensure terminology used in submittals conforms to ASME MC85.1.

1.7 SUBMITTALS FOR INFORMATION

A. See Division 1 Requirements.
B. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

1.8 SUBMITTALS AT PROJECT CLOSEOUT

A. See Division 1 Requirements.
B. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
   1. Revise shop drawings to reflect actual installation and operating sequences.
   2. Include data specified in "Submittals" in final "Record Documents" form.
C. Operation and Maintenance Data:
   1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
   2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
   3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
D. Warranty: Submit manufacturer’s warranty and ensure forms have been filled out in Owners name and registered with manufacturer.

1.9 APPROVED INSTALLING CONTRACTORS, QUALITY ASSURANCE

A. General
   1. The Building Automation System Contractor shall be JCI, branch office; South Bend, IN. Contract Jim Davis @ (514) 876-7851 (Cell Phone) – No Substitutions.
B. Workplace Safety and Hazardous Materials
   1. Provide a safety program in compliance with the Contract Documents.
   2. The BAS Contractor shall have a corporately certified comprehensive Safety Certification Manual and a designated Safety Supervisor for the Project.
   3. The Contractor and its employees and sub-trades comply with federal, state and local safety regulations.
   4. The Contractor shall ensure that all subcontractors and employees have written safety programs in place that covers their scope of work and that their employees receive the training required by the OSHA having jurisdiction for at least each topic listed in the Safety Certification Manual.
   5. Hazards created by the Contractor or its subcontractors shall be eliminated before any further work proceeds.
   6. Hazards observed but not created by the Contractor or its subcontractors shall be reported to either the General Contractor or the Owner within the same day. The Contractor shall be required to avoid the hazard area until the hazard has been eliminated.
   7. The Contractor shall sign and date a safety certification form prior to any work being performed, stating that the Contractors’ company is in full compliance with the Project safety requirements.
   8. The Contractor’s safety program shall include written policy and arrangements for the handling, storage and management of all hazardous materials to be used in the work in compliance with the requirements of the authority having jurisdiction at the Project site.
   9. The Contractor’s employees and subcontractor’s staff shall have received training as applicable in the use of hazardous materials and shall govern their actions accordingly.
C. Quality Management Program
   1. Designate a competent and experienced employee to provide BAS Project Management. The designated Project Manager shall be empowered to make technical, scheduling and related decisions on behalf of the BAS Contractor. At minimum, the Project Manager shall:
      a. Manage the scheduling of the work to ensure that adequate materials, labor and other resources are available as needed.

b. Manage the financial aspects of the BAS contract.
c. Coordinate as necessary with other trades.
d. Be responsible for the work and actions of the BAS workforce on site.

1.10 REGULATORY REQUIREMENTS

A. Conform to the 2012 International Building Code (IBC).
B. Conform to the 2012 International Fuel Gas Code (IFGC).
C. Conform to the 2012 International Fire Code (IFC), excluding Chapter 4.
D. Conform to the 2015 International Energy Conservation Code (IECC).
E. Conform to the 2015 International Mechanical Code (IMC).
F. Conform to the 2009 ICC Electrical Code.
G. Conform to 2008 NFPA 70, National Electrical Code.
H. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 DDC SYSTEM CONTROLLERS

A. Approved Manufacturer: General Purpose Fully Programmable Controllers shall be JCI BACnet.
   1. The General-Purpose Programmable Controller (PCA/PCG) by JCI shall be a fully user-programmable, digital controller that communicates via BACnet MS/TP protocol. There shall be no substitutions made as the owner has standardized on these.
      a. The PCG shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
   2. The PCG shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
   3. The PCG shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only shall not be acceptable.
   4. The PCG shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
   5. The PCG shall include a removable base to allow pre-wiring without the controller.
   6. The PCG shall include troubleshooting LED indicators to identify the following conditions:
      a. Power On
      b. Power Off
      c. Download or Startup in progress, not ready for normal operation
      d. No Faults
      e. Device Fault
      f. Field Controller Bus - Normal Data Transmission
      g. Field Controller Bus - No Data Transmission
      h. Field Controller Bus - No Communication
      i. Sensor-Actuator Bus - Normal Data Transmission
      j. Sensor-Actuator Bus - No Data Transmission
      k. Sensor-Actuator Bus - No Communication
   7. The PCG shall accommodate the direct wiring of analog and binary I/O field points.
   8. The PCG shall support the following types of inputs and outputs:
      a. Universal Inputs - shall be configured to monitor any of the following:
         1) Analog Input, Voltage Mode
         2) Analog Input, Current Mode
         3) Analog Input, Resistive Mode
         4) Binary Input, Dry Contact Maintained Mode

b. Binary Inputs - shall be configured to monitor either of the following:
   1) Dry Contact Maintained Mode
   2) Pulse Counter Mode
c. Analog Outputs - shall be configured to output either of the following
   1) Analog Output, Voltage Mode
   2) Analog Output, current Mode
d. Binary Outputs - shall output the following:
   1) 24 VAC Triac
e. Configurable Outputs - shall be capable of the following:
   1) Analog Output, Voltage Mode
   2) Binary Output Mode

9. The PCG shall have the ability to reside on a Field Controller Bus (FC Bus).
   a. The FC Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
   b. The FC Bus shall support communications between the PCGs and the Supervisory Controller.
   c. The FC Bus shall also support Expansion I/O (PCX) communications with the PCG and with the Supervisory Controller.
   d. The FC Bus shall operate at a maximum distance of 15,000 Ft. between the PCG and the furthest connected device.
10. The PCG shall have the ability to monitor and control a network of sensors and actuators over a Sensor-Actuator Bus (SA Bus).
   a. The SA Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard Protocol SSPC-135, Clause 9.
   b. The SA Bus shall support up to 10 devices per trunk.
   c. The SA Bus shall operate at a maximum distance of 1,200 Ft. between the PCG and the furthest connected device.
11. The PCG shall have the capability to execute complex control sequences involving direct wired I/O points as well as input and output devices communicating over the FC Bus or the SA Bus.
12. The PCG shall support, but not be limited to, the following:
   a. Chilled water/central plant automation applications including but not limited to:
      1) The selection and sequencing of up to 8 chillers of different sizes.
      2) The selection and sequencing of up to 8 (each) primary and secondary chilled water pumps of varying pump capacities.
      3) The selection and sequencing of up to 8 condenser water pumps.
      4) The selection and sequencing of cooling towers and bypass valve, including single speed, multi-speed, and Vernier control.
      5) A proven and documented central cooling plant optimization program that incorporates custom equipment efficiency profiles, without rewriting software code, in order to meet the building load using the least amount of energy as calculated.
      6) The use of advanced control algorithms that apply equipment specific parameters, including operational limits and efficiency profiles, in order to determine equipment, start and runtime preferences.
      7) The identification of the most efficient equipment combination and automatic control of state and speed of all necessary equipment to balance runtime, optimize timing and sequencing and ensure the efficiency and stability of the central cooling plant.
      8) The control definition for the chiller plant in a single FX-PCG, as supported by available memory and point Input / Output (I/O), or capable of being split across multiple FX-PCGs.
   b. Heating central plant applications.
   c. Built-up air handling units for special applications.
   d. Terminal and packaged units and unit ventilators.
   e. Special programs as required for systems control.

13. The PCG shall support a Local Controller Display (DIS) either as an integral part of the PCG or as a remote device communicating over the SA Bus. Local displays shall be provided when controllers are used in central plant or AHU applications but are not required on simple systems such as unit ventilators.
    a. The Display shall use a BACnet Standard SSPC-135, clause 9 Master-Slave/Token-Passing protocol.
    b. The Display shall allow the user to view monitored points without logging into the system.
    c. The Display shall allow the user to view and change set points, modes of operation, and parameters.
    d. The Display shall provide password protection with user adjustable password timeout.
    e. The Display shall be menu driven with separate paths for:
        1) Input / Output
        2) Parameter / Set point
        3) Overrides
    f. The Display shall use easy-to-read English text messages.
    g. The Display shall allow the user to select the points to be shown and in what order.
    h. The Display shall support a back lit Liquid Crystal Display (LCD) with adjustable contrast and brightens and automatic backlight brightening during user interaction.
    i. The display shall be a minimum of 4 lines and a minimum of 20 characters per line
    j. The Display shall have a keypad with no more than 6 keys.
    k. The Display shall be panel mountable.

2.2 ROOM SENSOR: PROVIDE JCI NS-BTXXXXX-2 (OR EQUAL)

A. Sensors shall be provided with +/- 1-degree temperature adjustment and override button.

2.3 CONTROL PANELS: PROVIDE JCI PAN-ENCXXXXWDP OF APPROPRIATE SIZE OR APPROVED EQUAL.

A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gages, pilot lights, push buttons and switches flush on cabinet panel face.
B. NEMA 250, general purpose utility enclosures with enameled finished face panel.
C. Provide straight screw driver latch (no keying) for all panels.

2.4 CONTROL VALVES: PROVIDE BELIMO B2/B3 CHARACTERIZED CONTROL VALVES AND BELIMO “F” SERIES BUTTERFLY VALVES OF APPROPRIATE SIZE AND TYPE (NO SUBSTITUTIONS PERMITTED). PROVIDE BELIMO LF/AF SPRING RETURN VALVE ACTUATORS OF APPROPRIATE SIZE AND TYPE (NO SUBSTITUTIONS PERMITTED)

A. Electronic, positive positioning, spring return, low voltage (24 VAC) actuators to be properly selected for the valve body and service.
B. Valve bodies to be 3-way mixing, 2-way normally open or normally closed to suit application. Bodies 2 inches and less to be 250 psig bronze, screwed connection, bronze seats, equal percentage plugs, stainless steel stems with Teflon packing. Over 2-inch bodies to be 125 psig iron, flanged connection with modified equal percent plug. Valve selection to be based on 3 psig drop across fully open valve.
C. The valves shall be sized by the control manufacturer and be provided with actuators of sufficient power for the duty intended. Valve body and actuator selection shall be sufficient to handle system pressure and shall close against the differential pressures to be encountered on the project.
D. Where required by the sequence of operation, valves shall be capable of being sequenced either with other valves or other actuated devices. Where such sequencing is required, the actual spring range, when adjusted for spring shift, shall be such that no overlapping occurs. In the event that spring shift causes an overlap, a pilot positioning operator shall be furnished.

E. Small Valves - 1/2 Inch through 2 Inch:
   1. Ball type.
   2. Valves shall be constructed with a two-piece cast brass body and screwed ends. Valves shall have removable packing gland with threaded cap for shaft seal. O-Ring type seals are unacceptable.
   3. Electric actuator shall be Belimo. Body rating shall be 400 psi at 50 degrees F. Body rating shall also meet or exceed ANSI B6.5 Class 250.
F. Valves - 2-1/2 Inches and Above:
   1. Ball or butterfly type.
   2. Valves shall be constructed with a cast iron body and have flanged connections. Valves shall have removable packing gland with threaded cap for shaft seal.
   3. Electric actuators shall be Belimo SY type actuators.
   4. Ball and butterfly valves need to achieve proper Cv. by use of reduced size and reducers or reduced port.
G. All control valves shall fail safe by spring return as follows:
   1. Heating: Fails open (N.O.).
   2. Cooling: Fails closed (N.C.)
   3. VAV Box Valves shall fail to open.
H. Electronic Operators:
   1. Acceptable Manufacturers:
      a. Belimo.
      b. No Substitutions.
   2. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
      a. 2” and smaller shall be SY Actuators and must be wired to controllers that are powered on the generator.
      b. 2-½” and larger shall be SY 24-volt Actuators and must be wired to controllers that are powered on the generator, they will not spring return they will fail to their current position.
   3. Select operator for full shut off at maximum pump differential pressure.

2.5 INTERIOR DAMPERS: PROVIDE JCI VD-1300 SERIES VOLUME CONTROL DAMPERS OF APPROPRIATE SIZE AND TYPE OR APPROVED EQUAL.

A. Acceptable Manufacturer:
   1. Johnson Controls, Inc.
   2. Ruskin.
   3. Pottorf.
B. Performance: Test in accordance with AMCA 500.
C. Frames: Galvanized steel welded or riveted with corner reinforcement.
D. Blades: Galvanized steel, maximum blade size 6 inches wide, 48 inches long, attached to minimum ½-inch shafts with set screws.
E. Blade Seals: Synthetic elastomeric or Neoprene mechanically attached, field replaceable.
F. Jamb Seals: Spring stainless steel.
G. Shaft Bearings: Graphite impregnated nylon sleeve, with thrust washers at bearings or lubricant free, stainless steel, single row, ground, flanged, radial, antifriction type with extended inner race.
H. Linkage Bearings: Graphite impregnated nylon.
I. Leakage: Less than 2 percent based on approach velocity of 2000 ft/min and 4 inches w.g.
J. Maximum Pressure Differential: 6-inches w.g.
K. Temperature Limits: -40 to 200 degrees F.

2.6 DAMPER OPERATORS: PROVIDE BELIMO DAMPER ACTUATORS OF APPROPRIATE SIZE (NO SUBSTITUTIONS PERMITTED)

A. Acceptable Manufacturers:
   1. Belimo (LF Series)
   2. No Substitutions.
B. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
C. Electric Operators: Actuators shall use a brushless DC motor and be protected from overload at all angles of rotation. Run time shall be constant and independent of torque. If required, 2 SPDT auxiliary switches shall be provided.
D. Number: Sufficient to achieve unrestricted movement throughout damper range. Provide one damper operator for maximum 25 sq. ft. damper section.

2.7 INPUT/OUTPUT SENSORS

A. Electronic Sensors: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.
   1. Thermistor or Resistance Temperature Detectors temperature sensors as follows:
      a. Accuracy: Plus-or-minus .3 C F at calibration point.
      b. Wire: Twisted, shielded pair cable.
      c. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
      d. Averaging Elements in Ducts: 17-foot-long; use where prone to temperature stratification or where ducts are larger than 9 sq. ft. length as required.
      e. Insertion Elements for heating system: Brass well with minimum insertion length of 2-1/2 inches. Stainless steel wells are required for all chiller systems.
      f. Room Sensors: Cover to be blank, with plus/minus 3-degree setpoint adjustable, and/or with override button at Owners choice.
      g. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
      h. Room Security Sensors: Stainless steel cover plate with insulated back and security screws.
   2. Static-Pressure Transmitter: Provide Veris PXPLX series of appropriate range or approved equal.
      a. Non-directional sensor with suitable range for expected input, and temperature compensated.
      b. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
      c. Output: 4 to 20 mA.
      d. Building Static-Pressure Range: 0 to 0.25-inch w.g.
      e. Duct Static-Pressure Range: 0 to 5-inches w.g.
   3. Pressure Transmitters: Provide Veris PWLX series of appropriate range with AA16A bypass valve assembly (No Substitutions Permitted)
      a. Direct acting for gas or liquid; range suitable for system; proportional output 4 to 20 MA. Water differential pressure sensors shall be as manufactured by Veris with a three-valve manifold.
B. Equipment operation sensors as follows: Provide Veris H708 current sensor of appropriate range or approved equal.
   1. Status inputs for Fans and Pumps: Current-sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.
C. Carbon Dioxide Room Sensors: Provide JCI CD-W00-N0-1 series wall mounted CO2 sensor (No Substitutions Permitted).
D. Outside Air Humidity and Temperature Sensor: Provide JCI HE-68P3-0N000 series OA mounted humidity and temperature sensor (No Substitutions Permitted).
E. Outside Photocell: Provide Kele EM-24A2 series OA mounted photocell sensor or approved equal.

2.8 MISCELLANEOUS DEVICES

A. Relays: Provide IDEC RR2P-ULAC24V series relay with corresponding SR2P-06 relay base (Or Equal)
   1. All relays are to be installed in control panels. Relays in box (RIB's) are not acceptable.
   2. Control relays shall be UL listed plug-in type with dust cover. Contact rating, configuration, and coil voltage suitable for application. Relays to be IDEC RR2P-UL AC24V with SR2P-06 base.

B. Transformers and Power Supplies: Provide Core Components LE series transformers of appropriate size & type, or Core LD05763 Power Supply mounted in control panels or approved equal.
   1. Control transformers shall be UL listed, Class 2 current-limiting type, or shall be furnished with over-current protection in both primary and secondary circuits for Class 2 service.
   2. Unit output shall match the required output current and voltage requirements. Current output shall allow for a 50% safety factor. Output ripple shall be 3.0 mV maximum Peak-to-Peak. Regulation shall be 0.10% line and load combined, with 50 microsecond response time for 50% load changes. Unit shall have built-in over-voltage protection.
   3. Unit shall operate between 0° C and 50° C.
   4. Unit shall be UL recognized.

2.9 COMMUNICATION CABLE

A. Provide plenum rated when running above ceilings.
B. Exposed cable in mechanical, storage, electrical, etc. rooms to run in minimum ¾" conduit.
C. Where exposed cable drops in occupied areas are unavoidable cable to be run in series 500/700 raceway/wiremold.

2.10 CONTACTORS

A. Provide definite purpose controllers equal to Siemens, Square D or Furnas Model 423F35AF. Provide 2, 3 or 4-pole as required by site conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.2 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
B. Provide metal thermostat/sensor guards for all thermostats/sensors located in pool area. Plastic are not acceptable.
C. Install software in control units and in operator workstation. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 17600.
D. Electrical material and installation shall be in accordance with appropriate requirements of Division 16.
E. Provide liquid tight flexible conduit for all BAS connections to equipment located in the Boiler Room and Mechanical Room.
F. Provide liquid tight flexible conduit for all equipment with vibration isolation.
G. BAS Wiring
   1. All conduit, wiring, accessories and wiring connections required for the installation of the BAS, as herein specified, shall be provided by the BAS Contractor 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 BAS wiring materials and installation methods shall comply with BAS manufacturer recommendations.
3. The sizing type and provision of cable, conduit, cable trays, and trunking shall be the design responsibility of the BAS Contractor. If complications arise, however, due to the incorrect selection of cable, cable trays, trunking and/or conduit by the BAS Contractor, the Contractor shall be responsible for all costs incurred in replacing the selected components.

H. BAS Raceway
1. All wiring in rooms (Mechanical, Boiler, Mezzanine, Storage, Etc.) with no drop ceiling shall be installed in conduit. Wiremold or equal raceway shall be used in occupied spaces and below drop ceiling. Minimum control wiring conduit size ¾ inch.
2. All conduits and raceways 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."

I. Provide setup time to configure Owner's smartphones for remote web access.

3.3 MANUFACTURER'S FIELD SERVICES

A. Prepare and start systems.
B. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

3.4 INPUT/OUTPUT SCHEDULES

A. See Specification Section 17600 "Sequence of Operation for HVAC controls".

END OF SECTION