CONSULTANTS:

ASDG, LLC    — STRUCTURAL ENGINEER
DESIGN MECHANICAL, INC.    — M.E.P. ENGINEER

DATE:
FEBRUARY 25, 2020

PROJECT No.:
18-16C

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ADVERTISEMENT FOR BIDS

Sealed bids will be received by the Lincoln County R-III School District, 951 West College Street, Troy, Missouri 63379 until TUESDAY, MARCH 17, 2020 AT 2:00 P.M. CDT for the Lincoln County R-III School District Transportation Facility Renovation Package. Bids will be opened publicly at that time.

Drawings and specifications for this project are on file at the office of the Architect, Hoener Associates, Inc., 6707 Plainview Avenue, St. Louis, MO 63109, (314) 781-9855, FAX (314) 781-0163.

Information as to bidding instructions and requirements for procuring bidding documents may be obtained from the Architect.

Not less than the prevailing hourly wage rates, as determined by the State of Missouri, Division of Labor Standards, shall be paid all workers employed on this project.

The Board of Education reserves the right to waive technicalities, to select any contractor filing a proposal, and to reject any or all bids.

NO PRE-BID MEETING IS SCHEDULED.

By: Dr. Todd Culbertson
Assistant Superintendent
1. PROPOSALS

1.1 Bid shall be placed in opaque, sealed envelope and marked:

**LINCOLN COUNTY R-III SCHOOL DISTRICT**
**TRANSPORTATION FACILITY RENOVATION PACKAGE**

1.2 All bids, mailed or otherwise delivered, shall be filed at or before the date and time designated in the Advertisement for Bids.

1.3 The Owner will open the bids in public session.

1.4 Bids may be withdrawn by written or telegraphic notice, provided such notice is received prior to the time set for the opening of bids.

1.5 No oral, telephonic, or telegraphic proposals or modifications will be considered.

1.6 Proposals must be filed on copy or facsimile of "Form of Bid" furnished by the Architect.

1.7 MODIFYING STATEMENTS OF ANY KIND SHALL BE STATED SEPARATELY; THE STATEMENT MUST BE FILED IN THE SAME ENVELOPE WITH THE BID. THE OWNER RESERVES THE RIGHT TO CONSIDER SUCH STATEMENTS A SUFFICIENT CAUSE FOR REJECTING BID, SHOULD UNCERTAINTY OF PROCEDURE OR COST DEVELOP THEREOF.

1.8 The Owner reserves the privilege of extending the time of receiving bids. In the event the time is extended, all holders of bidding documents will be informed simultaneously by written instructions issued through the Architect's office.

1.9 By filing a proposal, the Bidder agrees that pricing shall hold firm for a period of forty-five (45) days following the date of filing.

1.10 Each General Contractor shall submit with the bid a full list of all subcontractors proposed to be used on this project, as required on the Form of Bid. The Owner reserves the right to consider rejection of the bid, for failure to include the required list of subcontractors. Refer to Supplementary Conditions, Article 5.

1.11 Each General Contractor shall submit a Contractor's Qualification Statement as required under this section. Refer to Part 8. The Owner reserves the right to consider rejection of the bid, for failure to include the required qualification statement.

1.12 By filing a proposal, the bidder agrees to include all premium time and overtime required to complete this schedule as outlined on the Form of Bid.

2. EXAMINATION OF DOCUMENTS AND INSPECTION OF SITE

2.1 The Bidder shall carefully examine the drawings, schedules, General Conditions, and specifications and inform himself fully as to all conditions and matters which can in any way affect the work or cost thereof.

2.2 It is necessary that the Bidder or his representatives visit the site of this project in order to familiarize himself with all phases of the work described herein.

2.3 Submitting a bid shall constitute full evidence that the Bidder has examined the site, read the specifications, examined the drawings, and is fully cognizant of the conditions under which the work will be conducted.
3. OMISSIONS, DISCREPANCIES, AND SUBSTITUTIONS

3.1 Requests for substitutions of materials must be made in writing no later than 5:00 P.M. CDT on Tuesday, March 10, 2020. Requests submitted after that date will not be considered.

3.2 All Bidders will be informed in writing by the Architect of all interpretations or acceptable material substitutions made during the time of bidding; in the absence of such approval all items shall be furnished as specified.

3.3 Should a Bidder find omissions from, or discrepancies in the drawings, specifications or other documents, or should he be in doubt as to their meaning, he shall at once notify the Architect in writing and obtain clarifications prior to submitting a bid.

(1) All clarifications to the Architects Office shall be submitted in writing prior to bid day.

3.4 All bulletins, letters, or addenda affecting the work, issued during the time of bidding, shall be covered in the proposal and will become a part of the Construction Contract.

4. DISPOSITION OF BIDS

4.1 The Owner agrees to notify all Bidders as to the disposition of the award of the Contract within forty-five (45) calendar days after the filing of bids.

4.2 The Owner reserves the right to accept any, or to reject any or all bids.

4.3 The Owner reserves the right to enter into negotiations with any Bidder.

4.4 The Owner reserves the right to make such changes in program or to change and adjust drawings and specifications as may be required to comply with the Owner’s budgetary or other requirements.

4.5 The Owner reserves the right to waive any breach of technicality or alleged technicality.

5. CONTRACT AND BOND

5.1 Form of contract shall be A.I.A. Form A-101, "Standard Form of Agreement Between Owner and Contractor for Construction of Building". (Stipulated sum forms basis of payment.)

5.2 Each Bidder shall state separately as indicated on the "Form of Bid" the cost of premium for furnishing a "Performance Bond" and "Payment Bond" as described in A.I.A. Form A-312. The Bonding Company shall have an A.M. Best Rating of A, V, or better.

5.3 A bid bond or bid deposit check will be required of Bidders.

6. DRAWINGS AND SPECIFICATIONS (PAPER COPY AND/OR ELECTRONIC COPY)

6.1 General Contractors (One Set of Bid Documents and One Electronic Set)
A security deposit check will be required in the amount of $50.00, (Fifty Dollars), for one physical set of bidding documents. A set of bidding documents shall consist of one set of drawings, one set of specifications, details, and addenda as issued. Electronic set of documents to be issued via e-mail.

A. The check, made payable to the Architect, shall serve as a security deposit to insure the return of the documents to the Architect.

B. Upon return of the documents (drawings, specification and detail books, and addenda) in good condition to the office of the Architect, the deposit check will be returned.

C. Returned documents must be bound together in the same order as when issued, free of extraneous markings.
D. In the event the documents are not returned within a period of twenty (20) calendar days after filing of bids, then the deposit check will be forfeited to the Architect as payment for drawings and specifications.

Subcontractors (One Electronic Set)
One electronic set issued by the Architect to the Sub-Contractor. A set of bidding documents shall consist of an electronic .pdf file or link, via e-mail, of the drawings, specifications, details, and addenda as issued.

7. BID DEPOSIT

7.1 Each General Contractor shall file with his bid a cashier's check in the amount of five percent (5%) of the total bid.

A. In lieu of a cashier's check, a surety company bid bond in the minimum amount of five percent (5%) of the total bid will be acceptable. The bond MUST be on AIA Form A310 to be accepted. The bid bond amount shall cover the TOTAL CONTRACT amount including performance and payment bond costs.

B. The check or bond shall be submitted as evidence of good faith on the part of the Contractor that he will proceed into execution of a formal contract for the erection, construction, and completion of the work or such portion of the work as may be determined by the Owner. Check shall be made payable to the Owner.

C. Bid bond or cashier's check of the unsuccessful bidders will be returned after award of contract has been made, and that of the successful bidder will be returned after execution of the Contract.

8. QUALIFICATION STATEMENT

8.1 Each bidder submitting a bid shall utilize the "Contractor's Qualification Statement AIA A305" bound in this Specification as Appendix "C".

8.2 The Qualification Statement shall be completely filled out with all requested information and returned WITH THE BID.

8.3 Bids will not be received from any bidder who has not filed a Qualification Statement with the Architect.

9. MINIMUM WAGE RATES

9.1 Bidder should note that minimum wage rates, established by law, and listed in Appendix “B” must be paid for all labor performed at the site; see Supplementary Conditions, Article 13.

10. EQUAL OPPORTUNITY

10.1 The Bidder shall note that the provisions of the Equal Opportunity clause as described in the Supplementary Conditions, Article 13, shall apply to this work.

11. "MISSOURI DOMESTIC PRODUCTS PROCUREMENT ACT"

11.1 The Bidder should note that Senate Bill No. 74 establishes by act, that all public agencies entering into a contract for the purchase, manufacturing, installation, construction, alteration, repair, or maintenance of any public work shall be provided utilizing goods or commodities manufactured or assembled in the United States; See Supplementary Conditions, Article 13.
12. STORAGE AND DELIVERY OF MATERIALS

12.1 The contractor shall include in their bid all costs associated with storage and delivery of all products related to this project until Substantial Completion. The costs shall include, but not limited to, storage costs, insurance, delivery, stocking, trucking, etc., as required to maintain products until needed on the job site.

13. OWNER’S SPECIAL TAX EXEMPTION

13.1 The Contractor will use the Owner’s tax exempt status for all purchases of materials and equipment for use on this project. The Owner will provide the Contractor with the Owner’s tax exemption number and certificate to be used for the purchase of all materials and equipment. **Sales tax will not be required.**

13.2 The Contractor shall be required to provide all necessary accounting, invoice records, etc., and assistance as requested by the Owner in order to utilize the Owner’s Tax Exempt status.

14. PRE-BID MEETING

14.1 NO PRE-BID MEETING IS SCHEDULED.

15. KEY DATES

15.1 Refer to Section 00300 for Key Dates.

16. “E-VERIFY” MISSOURI STATUTE

16.1 The Bidder should note that this Contractor shall comply with the Missouri Statute 285.530 titled “E-Verify” Addendum.

17. “OSHA” STATUTE

17.1 The Bidder should note that this Contractor shall comply with The Missouri Statute 292.675 Titled “OSHA – TRAINING REQUIREMENTS FOR CONSTRUCTION LABORERS”.

18. DRUG AND ALCOHOL TESTING

18.1 The Contractor shall comply with the requirements of Section 167.371.1, RSMo, which stipulates that contractors and subcontractors on public works construction projects at public schools establish and implement a random drug and alcohol testing program. Any program must be administered by a certified laboratory and must require notification to the contractor/subcontractor and the contractor’s/subcontractor’s employee of the results of any positive drug and alcohol test.

The School District must be notified of the action taken to protect the safety of the students and staff as a result of a positive test. The contractor/subcontractor will pay for the costs of the program.

19. PROJECT SUPERINTENDENT

19.1 The Contractor shall provide one (1) full time Project Superintendent – who shall be present on site and accountable on a daily basis for all construction activities and materials on site. The same one (1) Project Superintendent shall remain as such for the entire length of the construction schedule through substantial completion and project closeout.
20. CRIMINAL HISTORY RECORD

20.1 At the request of the Owner, Contractor shall submit, or cause to be submitted, to the Missouri State Highway Patrol a Criminal History Record Request Form for each and every employee, laborer, supervisor, foreman, or other person who will be present at the Project site during the performance of the Project, whether employed by Contractor or anyone working for or under Contractor. Contractor shall be responsible for paying all fees associated with the criminal background check(s). Contractor shall provide to Owner for Owner’s review the information received pursuant to all such requests. Owner shall have the right to prohibit any person(s) with a criminal background that is unacceptable, in the Owner’s sole judgment, from entering onto the Project site or from performing any work on the Project, whether for Contractor or any subcontractor.

Contractor shall contact the chief law enforcement official of the county in which the Project is located and obtain a list of all registered sex offenders currently residing in that County. Contractor agrees that it will not employ, or allow any of its subcontractors to employ, any person whose name appears on the sex offender list.

21. SECURITY GUIDELINES


21.2 Any workers(s) who violate security rules, disregard hazard signs, interfere with the Owner’s operation, refuse to obey order(s) of the Owner’s Representative, or are considered disorderly by the Owner’s Representative shall be discharged from the work.

22. M.E.P. WARRANTIES

22.1 Bidders should note that Mechanical, Plumbing and Electrical equipment, materials, and systems shall have at a minimum at two (2) year contractor and manufacturer’s parts and labor warranty. Various systems or equipment have longer warranty periods specified. Whichever warranty is longer shall apply.

END OF SECTION 00100
# SECTION 00300 - FORM OF BID

| Project: | LINCOLN COUNTY R-III SCHOOL DISTRICT  
TRANSPORTATION FACILITY RENOVATION PACKAGE |
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Proposal of ____________________________________________________________________________________

(hereinafter called “Bidder”) a corporation, organization and existing under the laws of the State of Missouri, a partnership, or an individual doing business as ____________________________________________________________________________________

To: LINCOLN COUNTY R-III SCHOOL DISTRICT

Gentlemen:

The Bidder, in compliance with your invitation for bids for the TRANSPORTATION FACILITY RENOVATION PACKAGE, having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the conditions of the proposed project, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the contract documents, as prepared by Hoener Associates, Inc., Architects, 6707 Plainview Avenue, St. Louis, Missouri, 63109, within the time set forth therein and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this proposal is a part.

The Bidder acknowledges receipt of the following addendum: ____________________________________________________________________________________

**A. Base Bid**

The Bidder agrees to perform all work described in the specifications and on the drawings, for the lump sum of: ________________________________________________________________________________ dollars ($__________)

**B. Performance Bond**

"Performance Bond" and "Payment Bond", A.I.A. Form No. A-312 for the Base Bid, shall be furnished by a Bonding Company with an A.M. Best Rating of A, V, or better, for all work included in the Base Bid amount; the cost of the Performance and Payment Bonds, which shall be added to the Base Bid, is: ________________________________________________________________________________ dollars ($__________)

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C. Time

The Bidder agrees to commence work as stipulated in the Contract Documents.

The Bidder hereby agrees to complete this project within _____ consecutive calendar days (after receipt of Notice to Proceed) and as further defined in General and Supplementary Conditions, Article 8, Time.

D. Subcontractors

NOTE: ALL GENERAL CONTRACTORS PREPARING BIDS ARE TO PROVIDE A COMPLETE LIST OF SUBCONTRACTORS AND/OR SUPPLIERS, TO THE ARCHITECT, WITH THE BID. THE SUBCONTRACTOR LIST SUBMITTED BY THE GENERAL CONTRACTOR, ON BID DAY WITH THE FORM OF BID, SHALL BE CONFIRMED WITHIN TWENTY-FOUR (24) HOURS AFTER THE BID DATE AND TIME.

The Bidder hereby indicates that the following subcontractors and/or suppliers as listed below and defined in Supplementary Conditions, Article 5, shall be employed under contract with the Bidder for use on this project (subject to Owner and Architect review and approval).

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E. Receipt of Bids

The Bidder understands that the OWNER reserves the right to reject any or all bids and to waive any technicalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of thirty (30) calendar days after the scheduled closing time for receiving bids.

F. Acceptance of Bid

Upon receipt of written notice of the acceptance of this bid, the Bidder will execute the formal contract attached within fifteen (15) calendar days and deliver to the OWNER a surety bond or bonds as required by the General Conditions.

G. Bid Security (Bid Bond)

The bid security attached in the sum of ______ (______) is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the OWNER caused thereby. The bid bond MUST be submitted on the AIA A310 Bid Bond Form to be accepted. The bid bond amount shall cover the TOTAL CONTRACT amount including performance and payment bond costs.

Respectfully submitted,

Contractor _____________________________
Physical Address _____________________________
________________________________________
Mailing Address (if different) _____________________________
________________________________________
Signature __________________________________
Typed Name _______________________________
Title _______________________________________
Telephone Number __________________________
Fax Number _______________________________
E-mail Address _____________________________

(Seal - if bid is by a corporation)

END OF SECTION 00300
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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
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ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

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

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and 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 or 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 THE PROJECT MANUAL
The Project Manual is a volume assembled for the Work which may include the bidding
requirements, sample forms, Conditions of the Contract and Specifications.

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

1.2.2 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 which have well-known
technical or construction industry meanings are used in the Contract Documents in
accordance with such recognized meanings.

1.3 CAPITALIZATION
1.3.1 Terms capitalized in these General Conditions include those which are (1)
specifically defined, (2) the titles of numbered articles and identified references to Paragraphs,
Subparagraphs and Clauses in the document or (3) the titles of other documents published by
the American Institute of Architects.

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

1.5 EXECUTION OF CONTRACT DOCUMENTS
1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the
Owner or Contractor or both do not sign all the Contract Documents, the Architect shall
identify such unsigned Documents upon request.

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

1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER
INSTRUMENTS OF SERVICE
1.6.1 The Drawings, Specifications and other documents, including those in electronic
form, prepared by the Architect and the Architect’s consultants are Instruments of Service
through which the Work to be executed by the Contractor is described. The Contractor may
retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or
material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect’s consultants, and unless otherwise indicated the Architect and the Architect’s consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, except the Contractor’s record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect’s consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect’s consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect’s consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ copyrights or other reserved rights.

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 Subparagraph 4.2.1, the Architect does not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

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

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner’s obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.
2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

2.3 OWNER'S RIGHT TO STOP THE WORK

2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently 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 Subparagraph 6.1.3.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

3.1 GENERAL

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

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

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

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished.
by the Owner pursuant to Subparagraph 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require.

3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but 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. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect.

3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect in response to the Contractor's notices or requests for information pursuant to Subparagraphs 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Subparagraphs 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Subparagraphs 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.

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

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

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

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

3.4.2 The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.

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

3.5 WARRANTY

3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor’s warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.6 TAXES

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

3.7 PERMITS, FEES AND NOTICES

3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

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

3.7.3 It is not the Contractor’s responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume responsibility for such Work and shall bear the costs attributable to correction.

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;

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 Clause 3.8.2.1 and (2) changes in Contractor's costs under Clause 3.8.2.2.

3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

3.9 SUPERINTENDENT

3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

3.10.2 The Contractor shall prepare and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

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 which 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. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Subparagraph 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 which 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 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. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

3.12.6 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

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

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

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

3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs

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

3.13 USE OF SITE
3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

3.14 CUTTING AND PATCHING
3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

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

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

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may so do and the cost thereof shall be charged to the Contractor.

3.16 ACCESS TO WORK
3.16.1 The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

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

3.18 INDEMNIFICATION

3.18.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Paragraph 11.3, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.

3.18.2 In claims against any person or entity indemnified under this Paragraph 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 Subparagraph 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

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 new Architect against whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the former Architect.

4.2 ARCHITECT'S 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 (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.
4.2.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Subparagraph 3.3.1.

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

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

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

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

4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, 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 Paragraphs 3.3, 3.35 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will 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, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

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

4.2.11 The Architect will 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 no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

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 initial decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

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

4.3 CLAIMS AND DISPUTES

4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of 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. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Time Limits on Claims. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Architect and the other party.

4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Subparagraph 9.7.1 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.

4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown...
physical conditions of an unusual nature, which 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, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

4.3.5 Claims for Additional Cost. If the Contractor wishes to make claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for claims relating to an emergency endangering life or property arising under Paragraph 10.6.

4.3.6 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Paragraph 4.3.

4.3.7 Claims for Additional Time

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

4.3.7.2 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.

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

4.3.9 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed would cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.
4.3.10 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination in accordance with Article 14. Nothing contained in this Subparagraph 4.3.10 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

4.4 RESOLUTION OF CLAIMS AND DISPUTES

4.4.1 Decision of Architect. Claims, including those alleging an error or omission by the Architect but excluding those arising under Paragraphs 10.3 through 10.5, shall be referred initially to the Architect for decision. An initial decision by the Architect shall be required as a condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner.

4.4.2 The Architect will review Claims and within ten days of the receipt of the 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 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 Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect’s sole discretion, it would be inappropriate for the Architect to resolve the Claim.

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

4.4.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the Architect when the response or supporting data will be furnished or advise the Architect that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect will either reject or approve the Claim in whole or in part.

4.4.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be final and binding on the parties but subject to mediation and arbitration.

4.4.6 When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30
days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or 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 Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

4.4.8 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 prior to resolution of the Claim by the Architect, by mediation or by arbitration.

4.5 MEDIATION
4.5.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5 shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

4.5.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable 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.

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

4.6 ARBITRATION
4.6.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 4.5.

4.6.2 Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

4.6.3 A demand for arbitration shall be made within the time limits specified in Subparagraphs 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.
4.6.4 Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect’s employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. 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.

4.6.5 Claims and Timely Assertion of Claims. 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.

4.6.6 Judgment on Final Award. 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.

ARTICLE 5 SUBCONTRACTORS

5.1 DEFINITIONS

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

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

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

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no objection.
reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

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

5.3 SUBCONTRACTUAL RELATIONS

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

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to those including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Paragraph 43.
6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

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

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

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

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

6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 6.2.5.

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 Subparagraph 3.14.

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

ARTICLE 7 CHANGES IN THE WORK

7.1 GENERAL

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

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

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

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

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3.

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 Subparagraph 7.3.6.

7.3.4 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.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the


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1735 New York Avenue, N.W.
Washington, D.C. 20006-5292

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method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect 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, a reasonable allowance for overhead and profit. In such case, and also under Clause 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 Subparagraph 7.3.6 shall be limited to the following:

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

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

7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties’ agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That 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 4.

7.3.9 When the Owner and Contractor agree with the 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 shall be recorded by preparation and execution of an appropriate Change Order.

7.4 MINOR CHANGES IN THE WORK

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

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 Paragraph 9.8.

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

8.2 PROGRESS AND COMPLETION

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

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 12 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic’s liens and other security interests.

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

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 43.

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

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

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

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment.
9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor’s right to payment as the Owner or Architect may require, such as ‘copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

9.3.1.1 As provided in Subparagraph 7.3.8, such applications may include requests for payment on account of changes in the Work which 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 Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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

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

9.4 CERTIFICATES FOR PAYMENT

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

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect’s evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect’s knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (i) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work.

Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3)
reviewed copies of requisitions received from Subcontractors and material suppliers and other
data requested by the Owner to substantiate the Contractor's right to payment, or (4) made
examination to ascertain how or for what purpose the Contractor has used money previously
paid on account of the Contract Sum.

9.5 DECISIONS TO WITHHOLD CERTIFICATION
9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the
extent reasonably necessary to protect the Owner, if in the Architect's opinion the
representations to the Owner required by Subparagraph 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 Subparagraph 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 Subparagraph 3.3.2, because of:
.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such
claims unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or for
labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance
of the Contract Sum;
.5 damage to the Owner or another 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 persistent failure to carry out the Work in accordance with the Contract
Documents.

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

9.6 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 promptly pay each Subcontractor, upon receipt of payment
from the Owner, out of the amount paid to the Contractor on account of such
Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled,
reflecting percentages actually retained from payments to the Contractor on account of such
Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with
each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a
similar manner.

9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information
regarding percentages of completion or amounts applied for by the Contractor and action
taken thereon by the Architect and Owner on account of portions of the Work done by such
Subcontractor.
9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the
payment of money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided

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

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

9.7 FAILURE OF PAYMENT

9.7.1 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 arbitration, then the
Contractor may, upon seven additional days’ written notice to the Owner and Architect, stop
the Work until payment of the amount owing has been received. The Contract Time shall be
extended appropriately and the Contract Sum shall be increased by the amount of the
Contractor’s reasonable costs of shut-down, delay and start-up, plus interest as provided for in
the Contract Documents.

9.8 SUBSTANTIAL COMPLETION

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

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

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

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

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Clause 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. 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 Subparagraph 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 written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect’s knowledge, information and belief, and on the basis of the Architect’s on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect’s final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 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
the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 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 control, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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

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

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

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 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 Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 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 load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.3 HAZARDOUS MATERIALS

10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

10.3.2 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 verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up, which adjustments shall be accomplished as provided in Article 7.

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 Subparagraph 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) and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

10.4 The Owner shall not be responsible under Paragraph 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

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

10.6 EMERGENCIES
10.6.1 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 Paragraph 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

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

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

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be

maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor’s information and belief.

11.2 OWNER’S LIABILITY INSURANCE
11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner’s usual liability insurance.

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE
11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor’s usual sources as primary coverage for the Owner’s, Contractor’s and Architect’s vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor’s Liability Insurance under Clauses 11.1.1.2 through 11.1.1.5.

11.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

11.3.3 The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor’s Liability Insurance coverage under Paragraph 11.1.

11.4 PROPERTY INSURANCE
11.4.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder’s risk “all-risk” or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

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

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

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

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

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

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

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

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

11.4.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.
11.4.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

11.4.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Paragraph 11.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

11.4.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.4.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.4.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.6. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Paragraphs 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.5 PERFORMANCE BOND AND PAYMENT BOND

11.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.
11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

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

12.2 CORRECTION OF WORK

12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

12.2.2 AFTER SUBSTANTIAL COMPLETION

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

12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance 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 Paragraph 12.2.
12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

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

12.2.5 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Subparagraph 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
12.3.1 If the Owner prefers to accept Work which 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
13.1.1 The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS
13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Subparagraph 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.2.2 The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

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

13.4 RIGHTS AND REMEDIES
13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.
13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS
13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. 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 which do not become requirements until after bids are received or negotiations concluded.

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

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

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

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

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

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

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD
13.7.1 As between the Owner and Contractor:

.1 Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be
deemed to have accrued in any and all events not later than such date of Substantial Completion;

.2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and

.3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

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

.1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;

.2 an act of government, such as a declaration of national emergency which 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 Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Subparagraph 2.2.1.

14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Paragraph 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 Subparagraph 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

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

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 The Owner may terminate the Contract if the Contractor:

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

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

1. take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
2. accept assignment of subcontracts pursuant to Paragraph 5.4; and
3. finish the Work by whatever reasonable method the Owner may deem expedient. Upon 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 Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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

14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

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

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE
14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

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

1. cease operations as directed by the Owner in the notice;
2. take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
3. except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.
SECTION 00800 - SUPPLEMENTARY CONDITIONS (2004)

The preceding document entitled "General Conditions of the Contract for Construction" and marked "AIA Document A201 - 1997" shall govern all Work of this Contract, except as modified by these Supplementary Conditions.

The following Supplementary Conditions shall take precedence over, supplement, and modify specific articles or statements of the General Conditions.

ARTICLE 1 - GENERAL PROVISIONS shall be modified as follows:

Add the following Subparagraph 1.1.3.1 after Subparagraph 1.1.3:

1.1.3.1 Nothing contained in Subparagraph 1.1.3 shall alter the responsibilities established in Subparagraph 3.3.1.

Add the following Subparagraphs 1.2.1.1 and 1.2.1.2 after Subparagraph 1.2.1:

1.2.1.1 In case of conflict within or between the Contract Documents, the document or part thereof requiring the greater performance requirement, quantity, or quality shall take precedence.

1.2.1.2 Should it appear that any portion of the Work is not sufficiently detailed or explained on the drawings or in the specifications, the Contractor shall immediately request in writing that the Architect provide such additional drawings, specifications or explanations as may be necessary to clarify what Work is to be done. The Contractor shall comply with the information supplied by the Architect.

Add the following Subparagraph 1.2.2.1 after Subparagraph 1.2.2:

1.2.2.1 Neither the Architect nor Owner is liable to the Contractor or any subcontractor (of any tier) for omissions or duplications due to real or alleged error in arrangement or titling of matters in the Contract Documents.

Add the following Subparagraph 1.5.2.1 after Subparagraph 1.5.2:

1.5.2.1 Execution of the Contract by the Contractor is a representation that the Contractor shall complete all the work per the Stipulated Lump Sum of the Contract, including any adjustments, but not limited to, addition and/or deduct Alternatives, negotiated price and scope revisions, etc., and that the Contractor shall provide all material, labor, transportation, etc., to complete the entire project within the agreed upon schedule. The Contractor shall not be entitled to increases in material, labor, or transportation costs as a basis for a claim for an increased contract amount.

ARTICLE 2 - OWNER shall be modified as follows:

2.1.1 Add the following phrase to the beginning of the second sentence:

"Upon written request of the Architect, Contractor or any subcontractor or supplier of any tier,"

2.1.2 Delete Paragraph 2.1.2 and substitute the following language:

Within fifteen (15) days of receipt of a written request from Contractor or any subcontractor or supplier of any tier, the Owner shall provide a copy of any Payment Bonds for the Project, provide a legal description of the Project site and identify all persons claiming property interests in the Project site.

2.2.1 Delete the first sentence and substitute the following sentence:

Within fifteen (15) days of receipt of a written request from Contractor or any subcontractor or supplier of any tier, the Owner shall provide reasonable written evidence that financial arrangements have been made to fulfill Owner’s obligations under the Contract.
Add the following Subparagraph after Subparagraph 2.2.5:

2.2.6 The Owner shall provide the Contractor with information on the following matters:

(a) Owner’s intended use and operations at the Project site so that the Contractor can schedule and sequence its Work to avoid conflicts with Owner’s intended use and operations;
(b) Any special scheduling requirements for the Work; and
(c) Locations at the Project site for routing of delivery trucks, storage of materials and equipment prior to installation, office trailers, and worker parking.

ARTICLE 3 - CONTRACTOR shall be modified as follows:

3.2.1 Modify "Subparagraph 2.2.3" to "Subparagraphs 2.2.3 and 2.2.4" in first sentence.

3.2.1 Insert "in writing" between "promptly" and "to the Architect" in second sentence.

3.2.2 Insert "in writing" between "promptly" and "to the Architect" in both the first and second sentences.

3.2.3 Delete “knowingly” in last sentence.

3.3.1 Substitute “using appropriate” for “using the Contractor’s best” in first sentence.

Add the following Subparagraphs 3.3.1.1 thru 3.3.1.3 after Paragraph 3.3.1:

3.3.1.1 The Contractor shall be responsible for coordinating and scheduling all of the Work, including the portions of the Work performed by Contractor’s Subcontractors, sub-subcontractors, material suppliers, fabricators, and all other agents, employees, or other persons performing portions of the Work.

3.3.1.2 Where required by local codes, jurisdictions, etc., this Contractor shall arrange for the proper installation of such components or items of the Work that are not of the type normally performed by Contractor’s personnel, by contracting with persons or entities properly qualified for such work to perform those portions of the Work.

3.3.1.3 The Contractor shall review any and all specified construction or installation procedures (including those recommended or required by any product manufacturer). The Contractor shall advise the Architect in writing: (a) if following the specified procedures will affect any warranties; (b) if the specified procedures conflict with or violate the procedures recommended or required by any product manufacturer; or (c) of any objections which the Contractor may have with the specified procedures.

3.4.2 Delete Paragraph 3.4.2.

Add the following Subparagraphs 3.4.2.1 thru 3.4.2.6 after Paragraph 3.4.1:

3.4.2.1 The specification or identification of a certain brand, make, or manufacturer shall convey the style, type, character, capacity, function, quality, performance requirement, design, and appearance of the article required.

3.4.2.2 All materials shall be factory labeled or shall be shipped in labeled containers describing the contents. Labels and containers shall be retained as necessary for review by the Architect.

3.4.2.3 Erection, application, or installation of materials and equipment shall be in accordance with manufacturer's instructions, specifications and/or recommendations.

3.4.2.4 Substitutions of materials and equipment are not permitted without the prior written approval of the Architect and Owner.
3.4.2.5 The Contractor may submit written requests for approval of a proposed substitution for specified materials and equipment. The request must include an explanation of the reason why the substitution should be considered. Possible reasons can include:

(a) The specific material, product, component, assembly, or item specified or required as part of the Work is no longer manufactured, produced, fabricated, or has materially changed from the item specified. The Contractor and any applicable subcontractor, supplier, manufacturer, or fabricator must certify this fact in writing;
(b) The proposed substitute provides a better value or product to the Owner. The Contractor and any applicable subcontractor, supplier, manufacturer, or fabricator must certify this fact in writing, and explain how or why the substitute provides a better value or product to the Owner; or
(c) The substitution is necessary in order to maintain the construction sequence or schedule for the Work and the delay attributable to use of the specified materials and equipment was beyond the control of the Contractor. The Contractor and any applicable subcontractor, supplier, manufacturer, or fabricator must certify these facts in writing.

3.4.2.6 By making a written request for substitution, the Contractor is deemed to:

(a) Represent that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified, utilizing the characteristics as defined in paragraph 3.4.2.1, and the relevant appropriate technical specification sections, drawings, and Project Manual information as a basis for selection and submission as a substitution;
(b) Represents that the Contractor will provide the same warranty for the substitution that the Contractor would have provided for that specified;
(c) Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
(d) Certifies that the cost data presented is complete and that the Contractor waives all claims for any additional costs related to the substitution; and
(e) The Contractor endeavored to select a substitution which met the appropriate criteria and did not require an adjustment to the Contract Sum.

3.4.3 Substitute “Work” for “Contract” at the end of the first sentence.

3.5.1 Delete third sentence and substitute the following:
“The Contractor’s warranty excludes coverage for damages or defects caused by abuse, modifications not made by the Contractor or those for whom Contractor is responsible, improper or insufficient maintenance, improper operation, or normal wear and tear.”

3.6.1 Delete “provided by the Contractor”.

Add the following Subparagraphs 3.6.2 thru 3.6.2.2 after Subparagraph 3.6.1:

3.6.2 If applicable, the Owner may utilize its tax exempt status for all material and equipment purchases.

3.6.2.1 The Contractor and all subcontractors and suppliers of any tier shall cooperate fully with the Owner in order to take advantage of and use the Owner's tax exempt status. Utilization of the Owner’s tax exempt status shall not relieve the Contractor of any responsibility or liability normally assumed by the Contractor with respect to purchasing, ordering, receiving, unloading, storing, or installing any items purchased on a tax exempt basis; nor shall the method of purchase affect any guarantees and/or warranties on the items or their installation; or on the Work in general.

3.6.2.2 The Contractor shall be required to provide all necessary accounting, invoice records, etc., as requested or directed by the Owner, and provide assistance to the Owner in order to utilize the Owner's tax exempt status.
Add the following Subparagraph 3.7.5 after Subparagraph 3.7.4:

3.7.5 The Contractor shall obtain **ALL** temporary and final occupancy permits required by local governing authorities, and shall specifically obtain the following, included but not limited to, inspections and approvals:

(a) Building inspections, and approvals.
(b) Mechanical inspections, and approvals.
(c) Plumbing inspections, and approvals.
(d) Fire marshal inspections, and approvals.
(e) Electrical inspections, and approvals.

3.7.5.1 The Owner will pay the cost of the building permit, fire district permit and related utility tap fees.

Supplement Paragraph 3.8.2.2 with the following language:

3.8.2.2 Contractor overhead shall include all insurance required by the contract as outlined in Appendix “A”.

Add the following Subparagraphs 3.10.1.1 thru 3.10.1.4 after Paragraph 3.10.1:

3.10.1.1 The Contractor shall prepare and submit a written copy of an itemized construction schedule indicating starting and completion dates of the major and critical items of work. If changes in the durations or sequencing set forth in the Contractor’s submitted schedule become necessary the Contractor shall revise the schedule and resubmit it to the Architect and Owner. The Contractor’s schedule must recognize and take into account that certain Work must be scheduled and coordinated in advance to permit appropriate adjustments in the Owner's operations which will allow the Contractor to perform its Work. The Contractor must follow the submitted schedule. The schedule shall be a bar chart or similar graph based on the items of work listed on the "Schedule of Estimated Values". The schedule shall be submitted prior to Contractor commencing Work. The Contractor shall submit an updated schedule with each Application for Payment and the updated schedule shall reflect current progress and anticipated completion dates for each item of work. The Contractor shall not be entitled to receive any payments until the current schedule has been updated and submitted.

3.10.1.2 Prior to commencing work, the Contractor shall meet with the Architect and Owner to discuss routing of delivery trucks at the site, location of storage and office areas, requirements for parking permits and parking locations.

3.10.1.3 The Contractor shall be required to schedule and sequence the Work as necessary in order to allow for Owner's operations at the Project site.

3.10.1.4 The Contractor shall not mobilize on site and commence work on the project site without receipt of written approval of Performance Bond, Payment Bond, and Insurance.

Add the following Subparagraphs 3.12.5.1 thru 3.12.5.5 after Paragraph 3.12.5:

3.12.5.1 Submittal of shop drawings shall be on the following basis:

(a) All shop drawings shall be submitted to the Architect's office, and shall have a cover sheet or title block containing the following information:

(1) Project title.
(2) Owner's name.
(3) Architect's job number.
(4) Contractor's, subcontractor's, sub-subcontractor's, or distributor's name, address, and phone number making the submittal.
(5) Delivery date or dates for items shown.
(6) Item submitted.
(7) Supplier name.
(8) Manufacturer name.
(b) For standard manufactured items, submit four (4) copies of the manufacturer's catalog sheets, showing illustrated cuts of the items to be furnished, scale details, sizes, dimensions, performance characteristics, capacities, wiring diagrams and controls and all other pertinent information. Items shall be clearly identified or noted.

(c) For Structural Steel and reinforcing shop drawings, submit four (4) copies of each sheet.

(d) For all other Work, submit four (4) copies as called for in the specifications. The same procedure will be followed as stated for structural steel shop drawings.

(e) Shop drawings for Plumbing, HVAC and Electrical work shall be sent, after Contractor's approval, to the Architect.

(f) If, in order to complete the Work, additional copies of shop drawings or any other information are desired, these shall be supplied without additional cost to the Owner or Architect.

3.12.5.2 Shop drawings shall relate to adjacent work and indicate required clearances, dimensions, shop and field joints, jointing methods, details of construction, sizes of all members, methods of erection, methods of securing to adjacent work, accessory items, and finishes; and shall include a complete listing of prefabricated items and shall provide complete details for any shop-fabricated items.

3.12.5.3 Furnish full-size templates and rough-in drawings prior to delivery of any items requiring site preparation.

3.12.5.4 Samples shall be accompanied by a letter of transmittal which contains all of the information required under Subparagraph 3.12.5.1(a). Samples shall be submitted only through the Contractor.

3.12.5.5 Materials and equipment covered by catalog and data sheets will be approved only on the basis of published ratings.

Add the following Subparagraphs 3.12.6.1 thru 3.12.6.5 after Subparagraph 3.12.6:

3.12.6.1 In the case of mechanical and/or electrical equipment, the Contractor shall require review, cross coordination, and approval of shop drawings or samples by the appropriate subcontractors and suppliers of any tier prior to submittal to the Architect.

3.12.6.2 It shall be incumbent upon the Contractor to identify any discrepancies within the Contract Documents where materials, equipment, products, assemblies, or components require interface with or connect to the work of other trades. Any such discrepancy shall be identified and submitted in writing to the Architect for clarification and/or interpretation by the Architect.

3.12.6.3 Submittal of shop drawings, product data, samples, or similar submittals constitutes a representation by the Contractor and any applicable subcontractor and supplier, that they have determined and verified all necessary and applicable criteria related thereto requiring interface and/or connection to the work of other trades and that the item submitted shall fit and function as intended.

3.12.6.4 Failure of the Contractor to verify, review, coordinate, and cross coordinate the Work as required by Subparagraph 3.12.6.3 (regardless of any review and approval of shop drawings, product data, samples, or similar submittals by the Architect), shall not relieve the Contractor of the requirements and responsibilities set forth in Subparagraph 3.12.6.3. The Contractor shall be completely responsible for all costs associated with or resulting from the failure to comply with the requirements of Subparagraph 3.12.6.3.

3.12.6.5 The Contractor shall be deemed to have approved any shop drawings submitted to the Architect.
Add the following Subparagraph 3.12.8.1 after Subparagraph 3.12.8:

3.12.8.1 "Deviation" for purposes of Subparagraph 3.12.8 shall include any change in dimension, material, method of assembly, detail, manufacturer or model number. The Contractor must provide a clear written explanation of and justification for each such deviation. In the case of a deviation with respect to the manufacturer, model number or both, the Contractor shall verify that such item will be properly accommodated within the space indicated by the Contract Documents and that affected Work (e.g., wiring, voltage, phase amperage, concrete pads, structural support, openings, etc., in the case of mechanical equipment) has been checked and necessary revisions made by the Contractor, at no added cost to Owner. This Subparagraph does not relieve the Contractor from obtaining prior approval for any substitute materials or equipment.

Add the following Subparagraphs 3.12.10.1 and 3.12.10.2 after Subparagraph 3.12.10:

3.12.10.1 The design professionals must be licensed or certified in the State where the Project is located, and must be licensed or certified in the appropriate discipline.

3.12.10.2 The Contractor shall provide full information to the manufacturer as to the relevant performance requirements and conditions under which the materials, systems or equipment will be expected to operate. Certifications should be in the form of representation of performance under the anticipated operating conditions.

3.12.11 Contractor shall be solely responsible for verifying that the physical characteristics of all materials and equipment (i.e., height, length, width, weight, etc.) are fully compatible with the dimensions and support details provided in the plans and specifications for both the time of work at issue and all adjacent work - regardless of whether the materials and equipment are listed as approved or alternatives in the Contract Documents. The plans are based upon generic assumptions about the characteristics of the materials and equipment. The physical characteristics of the materials and equipment listed in the Contract Documents may differ from the characteristics assumed in the design of the Project. Any changes required to accommodate the materials and equipment selected by Contractor - even if from approved sources - shall be the sole responsibility of the Contractor.

Add the following Subparagraphs 3.13.2 thru 3.13.6 after Subparagraph 3.13.1:

3.13.2 If applicable based upon information provided by the Owner, the existing buildings and facilities must remain in operation during construction and the Contractor shall take reasonable precautions to prevent interruption of services and/or the Owner's operations except when specifically agreed to by the Owner.

3.13.3 If applicable based upon information provided by the Owner, the Contractor shall not: permit blocking of exits, driveways or sidewalks; cause a curtailment of Owner's essential services during working hours; or otherwise interfere with the Owner's use and operations at the Project site unless the Contractor has received prior written approval by the Owner or the Architect.

3.13.4 Interruption of services, if required, shall be arranged with the Owner and schedules agreed upon and adhered to in restoring such services.

3.13.5 The Contractor shall become familiar with and adhere to the Owner's security rules and provisions.

3.13.6 Any worker(s) who violate security rules, disregard hazard signs, interfere with the Owner's operations, refuse to obey orders of the Owner or Architect, or are considered disorderly as determined by the Architect or Owner, shall be discharged from the Project.

Add the following Subparagraph 3.14.1.1 after Subparagraph 3.14.1:

3.14.1.1 The Contractor shall be responsible for thoroughly familiarizing himself with the existing site and facilities, and shall be required to perform all cutting, removal, fitting, adjustment, and patching required to perform the Work or make its parts fit together properly as necessary to complete the Work.
Add the following Subparagraphs 3.15.3 thru 3.15.5 after Subparagraph 3.15.2:

3.15.3 Immediately after unpacking materials, all packing case lumber or other materials, excelsior, wrappings, or other like flammable rubbish shall be collected and removed from the building and/or premises by the Contractor or applicable subcontractor.

3.15.4 Before any interior painting is begun, or at such time as may be directed by the Architect, the Contractor shall be responsible for insuring that all trades thoroughly "broom clean" the spaces to be painted. This cleaning shall include the removal of all surplus materials from all surfaces; and all surfaces which are to be finished shall be left in a clean and suitable condition for painting and finishing.

3.15.5 Throughout construction the Project site and adjoining drives, parking areas and sidewalks shall be maintained neat and free of dirt and debris resulting from the Work. Accumulations of daily trash shall be periodically removed from the site. All areas shall be in a "broom clean, wet mopped, or vacuumed" condition when completed and ready for final inspection. Hardware, equipment, and all other exposed finish materials shall be cleaned of all extraneous paint, mortar, dirt, etc., immediately prior to the final inspection of the Work. All equipment with removable or detachable panels, covers, plates, etc., shall be cleaned on the inside before the apparatus is turned over for use by the Owner. All marred finishes shall be repaired, touched-up or replaced.

3.17.1 Add “in writing” at the end of the last sentence.

ARTICLE 4 - ADMINISTRATION OF THE CONTRACT shall be modified as follows:

Add the following Subparagraph 4.2.4.1 after Subparagraph 4.2.4:

4.2.4.1 The Owner and his separate contractor(s) shall communicate with the Contractor and/or Architect as necessary or appropriate to assist the Contractor and/or Architect where the work of the Owner or his separate contractor(s) affects the execution or completion of the Work and/or responsibilities under the Contract Documents.

Add the following Subparagraph 4.2.7.1 after Subparagraph 4.2.7:

4.2.7.1 The Architect's review will include review of appearance and general characteristics. In the case of structural work (structural steel, reinforcing steel, etc.), the Architect and the appropriate consulting engineer will check cross sectional size and structural adequacy of members, but not dimensions affecting placement with respect to other members. In the case of mechanical or electrical equipment, the Architect and the appropriate consulting engineer will check performance characteristics, finishes, and general arrangement of components.

4.2.11 Delete the last sentence.

Add the following Subparagraph 4.2.11.1 after Subparagraph 4.2.11:

4.2.11.1 Should a request for an interpretation of the requirements of the Contract Documents by the Owner or Contractor require a decision and/or interpretation by the Architect within a specific amount of time in order to avoid a delay to the Project's schedule or materially affect the sequencing of the Work, either party shall so notify the Architect of any such time requirement in writing. The Architect will endeavor to render its interpretation within the requested time period provided that there is sufficient time in the Architect's professional judgment to permit adequate review. Failure of the Architect to render such interpretation within the requested period of time shall not be the basis for any claim against the Architect.

Add the following Subparagraph 4.3.1.1 after Subparagraph 4.3.1:

4.3.1.1 Any and all persons or entities involved with or party to a Claim shall provide to the Architect, in a timely manner and without cost, all information, data, or documentation reasonably requested by the Architect.
4.3.2 Substitute “30 days” for “21 days” in both locations in the first sentence.

4.3.4 Substitute “30 days” for “21 days” throughout.

Add the following Subparagraph 4.3.5.1 after Subparagraph 4.3.5:

4.3.5.1 If the Owner wishes to make Claim for a decrease in the Contract Sum or for reimbursement of any costs from the Contractor, the Owner shall provide written notice to the Contractor prior to performing any work for which its Claim is based. Prior notice is not required for Claims relating to an emergency endangering life or property.

Supplement Paragraph 4.3.6 with the following language:

4.3.6 After execution of the Contract, claims for additional costs shall not be permitted for any and all increases in material, labor, transportation, etc., or other costs incurred by the Contractor related to the work.

Add the following Subparagraphs 4.3.6.1 thru 4.3.6.4 after Subparagraph 4.3.6:

4.3.6.1 As may be permitted under Missouri Revised Statute Section 34.058 (2), the Contractor shall not be entitled to any increase Contract Sum for delay damages of any kind (whether direct costs, indirect costs, idle equipment charges, or overhead costs), early completion bonuses or punitive damages.

4.3.6.2 Any claim for an increase in the Contract Sum shall be deemed to include all associated costs (whether direct costs, indirect costs, overhead costs, bond costs, insurance costs, financing costs, schedule-related costs, impact costs, inefficiency costs, or otherwise) and all associated fees or profits.

4.3.6.2.1 After execution of the Contract, claims for additional costs shall not be permitted for costs related to price increases for material, labor, transportation, storage of material(s), overhead supervision front office expenses, or project supervision costs resulting from delays in commencement of the work not caused by the Owner. Such cause of delays may include, but not limited to, approval of zoning, building permits, obtainment of easements, state and local authorities having jurisdiction on the project.

4.3.6.2.2 Any claim for increased contract sum shall include all overhead costs. Overhead cost shall include all applicable project insurance costs related to the project as outlined in Appendix “A”.

4.3.6.2.3 Any claim for increased contract sum where the contract requires a performance and material and labor payment bond, the bond cost shall be added (applied) to the total of the contact change order sum as the last item of the change order calculation. The contractor shall not apply the overhead and profit percentage to the cost of the bond.

4.3.6.3 If the Owner believes that it is entitled to a decrease in the Contract Sum or to reimbursement of any costs from the Contractor, the Owner shall file a Claim in accordance with this Paragraph 4.3.

4.3.6.4 Any party submitting a Claim for money shall provide, in a timely manner and without cost, all information, data, or documentation reasonably requested by the Architect.

Add the following Subparagraph 4.3.7.1.1 after Subparagraph 4.3.7.1:

4.3.7.1.1 The Contractor’s Claim shall identify the specific number of calendar days requested, shall provide justification for the requested extension and identify the probable effect of delay on the progress of the Work.
Add the following Subparagraphs 4.3.7.2.1 and 4.3.7.2.2 after Subparagraph 4.3.7.2:

### 4.3.7.2.1
Claims for increases in the Contract Time due to adverse weather conditions shall be submitted on a monthly basis only and must be submitted by the end of the month following the adverse weather conditions. Failure to timely submit any such request to the Architect will constitute a waiver of any such Claim.

### 4.3.7.2.2
Adverse weather conditions are conditions that are considered abnormal for the applicable time of year and must have actually had an adverse effect on the Work in progress, and must be in excess of the 30-year Normals, Means, and Extremes, as published by the National Weather Service, applicable to the location of the Project.

The Contractor's progress schedule must reflect these anticipated adverse weather days in all weather dependent activities. The following schedule of monthly anticipated adverse weather delays is as follows:

#### Monthly Anticipated Adverse Weather Delay

**Work Days Based on Calendar Days (Monday thru Sunday)**

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Actual adverse weather delay days must prevent work on critical path activities for Fifty (50) Percent or more of the Contractor's scheduled work day.

If the number of actual adverse weather delay days exceeds the number of days listed above, the Contractor shall notify the Architect in writing that the adverse weather delay days have been met.

### 4.3.8
Substitute “30 days” for “21 days” in the first sentence.

Add the following Subparagraph 4.3.8.1 after Subparagraph 4.3.8:

### 4.3.8.1
If either party wishes to make a claim for money or time related to the injury or damage, a Claim shall be filed in accordance with this Paragraph 4.3.

### 4.3.10
Delete this Paragraph.

### 4.4.1
Substitute “90 days” for “30 days” in the second sentence.

### 4.4.2
Substitute “30 days” for “ten days” in the first sentence.

### 4.4.4
Substitute “30 days” for “ten days” in the first sentence.
Delete last sentence and substitute the following: “Within 30 days of the receipt of the response or supporting data, if any, the Architect will take any action allowed under Subparagraph 4.4.2.”

### 4.4.5
Substitute “litigation” for “mediation and arbitration” in the second sentence.

### 4.4.6
Delete the entire Subparagraph, and substitute the following: “The Architect’s decision is admissible as evidence in any subsequent litigation.”

### 4.4.8
Delete “by mediation or by arbitration.”
4.5 Delete entire Paragraph, including Subparagraphs 4.5.1, 4.5.2, and 4.5.3.

4.6 Delete entire Paragraph, including Subparagraphs 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.6.5, and 4.6.6.

ARTICLE 5 - SUBCONTRACTORS shall be modified as follows:

5.2.1 The Contractor shall submit **WITH THE BID** a list of the subcontractors/suppliers as listed on the Form of Bid.

5.2.1.1 Delete the first sentence and substitute the following:
Within three days after award of the contract, the Contractor shall submit to the Architect three (3) copies of the Contractor’s list of all subcontractors, suppliers, and/or manufacturers whose labor, material or equipment is being furnished. This list shall include the name and contact person for each entity listed, and their address and telephone numbers.

Add the following Subparagraph 5.2.1.2 after Subparagraph 5.2.1:

5.2.1.2 Acceptance by the Owner and Architect of any Subcontractor shall not necessarily constitute acceptance of the materials proposed to be furnished by said Subcontractor or any of said Subcontractor’s sub-subcontractors.

Add the following Subparagraphs 5.2.3.1 and 5.2.3.2 after Subparagraph 5.2.3:

5.2.3.1 The Contractor shall provide, within 7 days, all information and documentation reasonably requested by the Owner or Architect with respect to subcontractor(s), sub-subcontractor(s); including dated bids or bid proposals or other such price proposals received by the Contractor, for review by the Owner or Architect in determining a mutually agreed upon adjustment of the Contract Sum and/or Contract Time as may be made necessary by a decision rendered under Subparagraph 5.2.3.

5.2.3.2 The Contractor shall furnish to the Owner or Architect a copy of all contracts between the Contractor and Subcontractors and/or suppliers, within 7 days of a request for the contracts by the Owner or Architect.

ARTICLE 7 - CHANGES IN THE WORK shall be modified as follows:

7.1.3 Insert “to perform the Changes in the Work” after “shall proceed promptly”.

Add the following subparagraph 7.1.4 after subparagraph 7.1.3:

7.1.4 The unit prices contained in the Contract are subject to change: (a) in the event of material changes in the conditions under which unit price work is to be performed; or (b) material changes in the quantities of the unit price work from the quantities anticipated at the time of contracting.

Add the following Subparagraph 7.2.3 after Subparagraph 7.2.2:

7.2.3 The adjustment to the Contract Sum reflected on a Change Order shall include or cover the entire costs and effects of the Change and its impact on all other portions and facets of the Work. Additional compensation will not be granted to the Contractor for any additional work made necessary by the Change or any impact caused or created by the Change if not included in the Change Order. No additional Contract Time shall be granted to the Contractor for any additional work made necessary by the Change or any impact caused or created by the Change if not included in the Change Order.

Add the following to the end of Subparagraph 7.3.3.2:

7.3.3.2 Unit prices, whether included in the bid or subsequently agreed to by the parties, shall reflect and include all reasonable costs associated with the scope of work identified for the unit cost item, and shall include the Contractor’s insurance costs, bond costs, overhead costs, and profit.
7.3.6 Insert the following after “overhead and profit” at the end of the first sentence: The total combined allowance for overhead and profit shall be based on the following schedule: For any work performed by the Contractor’s own forces: Ten percent (10%). For work performed by Contractor’s Subcontractors or sub-subcontractors: Ten percent (10%).

Add the following Subparagraphs 7.3.6.6 and 7.3.6.7 after Subparagraph 7.3.6.5:

7.3.6.6 Any claim for an increase Contract sum shall include all overhead costs. Overhead costs shall include all project insurance costs required for the project as outlined in Appendix “A”. Overhead costs shall include, but not limited to, all front office expenses, project management, normal and customary supervision, secretarial, accounting and related labor, field office expenses, small tools, and all normal and customary business operation expenses and costs.

7.3.6.7 Any claim for increase Contract sum where the Contract requires a Performance and Material and Labor Payment Bond, the bond cost shall be added (applied) to the total of the contract change order sum as the last item of the change order calculation. The Contractor shall not apply their overhead and profit percentage to the bond cost.

Add the following Subparagraph 7.3.10 after Subparagraph 7.3.9:

7.3.10 If the Contractor does not agree with the proposed adjustment in the Contract Time, the Contractor shall file a Claim in accordance with Paragraph 4.3.7.

ARTICLE 8 - TIME shall be modified as follows:

Add the following Subparagraph 8.1.2.1 after Subparagraph 8.1.2:

8.1.2.1 The date of beginning and the time for completion as specified in the Contract are essential conditions of this Contract.

Add the following Subparagraphs 8.2.4 thru 8.2.6 after Subparagraph 8.2.3:

8.2.4 The Work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified.

8.2.5 The Owner’s and/or Architect’s review of a Project schedule shall not relieve the Contractor of its responsibility to complete the Project within the Contract Time, and shall not create any rights in favor of the Contractor for completion earlier than the Contract Time.

8.2.6 The Contractor is not entitled to recover any damages or losses allegedly incurred because the Contractor was prevented from completing the Project earlier than the end of the Contract Time.

8.3.1 Delete “pending mediation and arbitration”.

Add the following Subparagraph 8.3.1.1 after Subparagraph 8.3.1:

8.3.1.1 The Contractor’s receipt of additional Contract Time shall be the only relief that Contractor shall be entitled to as a result of a delay. As may be permitted under Missouri Revised Statute Section 34.058 (2), the Contractor shall not be entitled to recover any delay damages of any kind or nature. See Subparagraph 4.3.6.1.

8.3.3 Delete this Subparagraph.
ARTICLE 9 - PAYMENTS AND COMPLETION shall be modified as follows:

9.2.1 Substitute “At least 15 days prior to submitting its” for “Before the” at the beginning of this Subparagraph.

Add the following Subparagraphs 9.2.1.1 thru 9.2.1.3 after Subparagraph 9.2.1:

9.2.1.1 The Schedule of Values shall be further categorized and allocated between facilities or locations if the Work is located at separate sites and/or existing separate facilities and:

   1. Each portion of the Work, by division or trade, shall be further divided into each location where Work is scheduled to be performed.

9.2.1.2 The Schedule of Values shall identify each phase of the Work and allocate costs between each phase.

9.2.1.3 The Contractor warrants that the breakdown amounts in its Schedule of Values are an accurate reflection of the total cost of each category or portion of the Work.

Add the following Subparagraphs 9.3.1.3 thru 9.3.1.8 after Subparagraph 9.3.1.2:

9.3.1.3 All Applications for Payments shall be based on the approved Schedule of Values, shall describe each item of work, identify the scheduled value for the item of work, state the previous amounts paid, identify requests for stored materials, state the percentage of Work completed to date, state the amount due, and identify the balance remaining to be earned and paid for each line item on the Schedule. AIA document Application and Certificate for Payment form G702 shall be used. Note that the Application for Payment must be consistent with the updated Project Schedule.

9.3.1.4 Payments will be made on a monthly basis.

9.3.1.5 With each Application for Payment the Contractor shall provide unconditional lien waivers from all Subcontractors, sub-subcontractors and suppliers of any tier for Work processed two months prior, covering both labor and material.

9.3.1.6 Until Substantial Completion, the Owner will pay 95% of the amount due the Contractor on any Application for Payment; the remaining 5% to be held as retainage to secure faithful performance of the Work and compliance with the Contract.

9.3.1.7 With each Application for Payment, the Contractor shall provide certified payroll records.

Add the following Subparagraph 9.6.3.1 after Subparagraph 9.6.3:

9.6.3.1 Any request by subcontractors of any tier for information concerning progress payments to the Contractor, as referred to in paragraph 9.6.3 shall be submitted to the Architect and Contractor in writing.

9.7.1 Delete the first sentence and substitute the following sentence:
If the Owner does not pay the Contractor within 30 days of the date the Contractor delivers a complete Application for Payment to the Architect with all required backup data and supporting documentation, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received.

9.8.3 Add the following at the end of the last sentence: “and with the new request the Contractor will provide the Architect with an updated list of items to be completed or corrected prior to final payment.”
Add the following Subparagraph 9.8.3.1 after Subparagraph 9.8.3:

9.8.3.1 If the Architect makes two inspections for substantial completion at the request of the Contractor and determines that any item, whether or not included on the Contractor's list, is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or use the Work or designated portion thereof for its intended use, the Contractor shall be responsible for paying the costs of all additional inspections by the Architect.

9.8.5 Delete the last sentence and substitute the following:
Such payment shall be reduced by an amount equal to 200% of the value of each item of Work which is not complete, as determined by the Architect.

Add the following Subparagraphs 9.8.6 and 9.8.7 after Subparagraph 9.8.5:

9.8.6 If the Contractor fails to complete any items listed by the Architect as incomplete as of the date of Substantial Completion within the time designated by the Architect pursuant to Subparagraph 9.8.4, the Owner may immediately, without the need for further notice to the Contractor, proceed to have the Work completed and deduct all costs thereof from the sums being withheld from the Contractor pursuant to Subparagraph 9.8.5.

9.8.7 All Work performed after Substantial Completion of the Work or any portion thereof shall be performed during hours that do not interfere with the Owner's use and activities in the area; and the Contractor shall be responsible for any associated overtime or premium time charges. Scheduling of this remaining Work shall be coordinated with the Owner and the Architect.

Add the following Subparagraphs 9.9.1.1, through 9.9.1.5 after Subparagraph 9.9.1:

9.9.1.1 The Architect may establish multiple and/or partial Substantial Completion Dates for the work, if applicable.

9.9.1.2 If a portion or part of the work or project is Substantially Complete, the Owner may occupy such portion. The Substantial Completion Date of such portion shall be determined by the Architect. The Contractor shall provide the Owner and Architect a written list of all known work to be completed or corrected (within that portion of the work) at the Date of Partial Substantial Completion. The Contractor shall endeavor to complete all remaining work as well as the items on an inspection list prepared by the Architect (and/or Consultants) within the specified time to complete same in the Contract.

9.9.1.3 The Owner retains the right to require the Architect to determine if a Partial Substantial Completion Date may be established for occupancy. The occupancy and use of such portion of the Project shall be predicated upon the approval by local authorities having jurisdiction of building and occupancy permits for the project including, but not limited to, local building inspectors, state elevator inspector, and/or fire marshal. In the absence of such authority, the Architect shall determine if the portion of the work is Substantially Complete. Establishment of such occupancy by the Architect does not relieve the Contractor of any responsibilities to complete the project in full compliance with all applicable codes, regulations, standards, etc., and per the Contract.

9.9.1.4 The Architect shall determine whether establishment of a Partial Substantial Completion Date(s) shall also include the commencement of standard or applicable warranties and guarantees. If in the opinion of the Architect, the standard or applicable warranties do not commence on the same date of the Partial Substantial Completion Date, the Architect shall identify such systems, components, or portions of the work, whereby the warranty/guarantee start dates do not commence with the Date of Partial Substantial Completion. The Architect shall notify the Contractor and Owner in writing identifying same and, if necessary, the cause for identification of same. The Architect shall not unreasonably withhold such approval/acceptance of systems, components or portions of the work without cause.

9.9.1.5 Establishment of a Partial Substantial Completion Date does not void applicable Liquidated Damages or portion thereof as required by or applicable to the Contract.
9.9.3 Add the following at the end of the sentence: ", shall not be deemed to be a waiver of any claims or rights by either the Owner or the Contractor, and shall not release any of Contractor's bonds."

Add the following Subparagraph 9.10.1.1 after Subparagraph 9.10.1:

9.10.1.1 If the Architect is advised by the Contractor that the Work is ready for final inspection with all items listed on Certificate of Substantial Completion completed, and upon inspection by the Architect, some items are found to be not in compliance with the Contract Documents, then the Owner may deduct from the amounts retained from the Contractor the costs associated with all subsequent inspections.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY shall be modified as follows:

Add the following Subparagraph 10.2.1.4 after Subparagraph 10.2.1.3:

10.2.1.4 All new and existing materials, fixtures, apparatus, and work shall be protected from damage whether incorporated into the finished Work or not, by protective devices, trailers, enclosures or coverings provided by the Contractor, unless otherwise specifically noted.

Add the following Subparagraph 10.2.2.1 after Subparagraph 10.2.2:

10.2.2.1 The Contractor, Subcontractor, sub-subcontractor, and any person, firm or entity involved in any aspect of the execution of the Work shall be experienced in the type of work or trade to be performed, shall be suitably trained and supervised as necessary, and shall be responsible for performing all Work in accordance with all applicable laws, ordinances, rules, regulations and lawful orders of federal, state and local public authorities, and public or private utility companies bearing on the safety of persons or property or their protection from damage, injury or loss. The Contractor shall be required to contact public authorities and public or private utility companies prior to execution of any Work as required by the appropriate authority, for review and approval prior to starting Work.

Add the following Subparagraphs 10.4.1 thru 10.4.3 after Subparagraph 10.4:

10.4.1 The Contractor, Subcontractors, sub-subcontractors, material suppliers and all parties directly or indirectly involved in the Work shall not incorporate any asbestos-containing materials in the Work.

10.4.2 The Contractor, Subcontractors, sub-subcontractors, material suppliers and all parties directly or indirectly involved in the Work shall notify the Architect and Owner in writing, prior to executing any Work where a product, material, equipment or component of any kind, without limitation, contains asbestos-containing materials (ACM). The Architect shall approve a substitute for use which does not contain asbestos.

10.4.3 Upon Completion of the Work, the Contractor shall submit to the Owner and Architect a written certification that no asbestos-containing materials were incorporated into the Work.

ARTICLE 11 - INSURANCE AND BONDS shall be modified as follows:

11.1.2 Delete this Subparagraph and substitute the following Subparagraph:

The insurance required by Subparagraph 11.1 shall be written for not less than the limits of liability specified in Appendix "A", or as required by law, whichever is greater. Appendix "A" is part of the Contract Documents. All insurance coverage shall be written on an "Occurrence" basis, and shall be maintained without interruption from the commencement of Work until date of final payment and termination of any coverage required to be maintained after final payment. The Contractor shall be responsible for paying any and all deductibles on policies provided in accordance with Appendix "A".

Add the following Subparagraphs 11.1.4 thru 11.1.10 after Subparagraph 11.1.3:

11.1.4 Liability Insurance shall include all major divisions or coverage and be on a comprehensive basis including:
2. Independent Contractor's Protective.
5. Contractual - including specified provision for Contractor's obligation under Paragraph 3.18.
6. Owner, non-owned and hired motor vehicles.
7. Broad Form Property Damage including Completed Operations.
8. Umbrella Excess Liability.

11.1.5 The Contractor, Subcontractors, sub-subcontractors and material suppliers or distributors shall provide all necessary property insurance coverages to fully cover all materials and equipment stored off site and during transit, regardless of whether such material has been paid for by the Owner, and not incorporated into the Work.

11.1.6 Certificates of Insurance shall be on the ACORD insurance certificate form 25-S, and three copies shall be provided to the Owner before the Contractor proceeds with any Work.

11.1.7 In the event of cancellation of any insurance, the Contractor shall immediately cease all operations until policies are again in force and Certificates filed with the Owner.

11.1.8 Each certificate of insurance and policy shall state that the coverage applies to the Work being conducted at the Project site(s).

11.1.9 Insert the following at the beginning of the last sentence: "If such insurance is purchased and maintained,"

11.1.10 Delete “an arbitration award in which case the procedure shall be as provided in Paragraph 4.6” and substitute “a final judgment issued by a Court of competent jurisdiction.”

Delete Subparagraph 11.4.10 and replace with the following:

11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved by litigation.

11.5.1 Delete Subparagraph 11.5.1 and substitute the following Subparagraph:
The Contractor shall furnish a Performance Bond and Payment Bond, each in the amount of 100% of the contract amount. The Bonding Company shall have an A.M. Best rating of A, M, or better. The bonds are to be executed by any acceptable surety company or companies authorized to execute such in the state in which the Project is located, and shall be approved by the Federal Government to provide bonding and surety on construction projects, and be written in favor of the Owner. If at any time the Owner for justifiable cause shall be or become dissatisfied with any surety or sureties who have written the Performance Bond and Payment Bond, the Contractor within five (5) days after notice from the Owner to do so, shall substitute an acceptable bond. Such premiums for other surety bonds shall be paid by the Contractor. No further payments shall be deemed due nor shall any be made until the new surety or sureties have furnished such an acceptable bond to the Owner.

11.5.2 Insert “and Owner” after “the Contractor”.

ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK shall be modified as follows:

12.1.1 Substitute “Architect or Owner” for “Architect” in all three locations in the Subparagraph.

Add the following Subparagraphs 12.1.1.1 after Subparagraph 12.1.1:

12.2.1.1 If the Contractor fails to correct such work within ten (10) days after receipt of written notice from the Owner or Architect, the Owner may have the work done and charge the costs thereof to the Contractor.
Add the following Subparagraphs 12.2.2.2.1 and 12.2.2.2.2 after Subparagraph 12.2.2.2:

12.2.2.2.1  Should the Contract Documents require a Special Warranty(s), (other than specified manufacturer’s warranties and guarantees) the Contractor’s obligations with respect to such work and Special Warranties shall run concurrently for the specified period of time so specified, without limitation.

12.2.2.2.2  In the event that a specified Warranty/Guarantee to be provided by a Manufacturer per the Contract Documents, not be provided the Contractor or available for submittal as specified, (due to circumstances/causes not under the control of the Contractor, without limitation), the Contractor shall provide the specified Warranty/Guarantee with the same essential terms from another reasonably acceptable source to meet the Warranty/Guarantee terms of the Contract Documents, prior to Final Completion.

ARTICLE 13 - MISCELLANEOUS PROVISIONS shall be modified as follows:

Add the following Subparagraph 13.8 after Subparagraph 13.7.3:

13.8  ATTORNEY’S FEES.  In the event of any dispute, claim or litigation arising out of or relating to this Contract, or the alleged breach thereof, or the Work, the prevailing party shall be awarded its attorney’s fees, expert witness fees, expenses and Court costs, at the trial and all appellate levels.

Add the following Subparagraphs 13.9.1 thru 13.9.11 after Subparagraph 13.8:

13.9.1  The rates of pay established by Appendix "B" shall cover all labor performed at the site.  These rates have been determined and adopted in accordance with the provisions of Sections 290.210 to 290.340 V.A.M.S., the Division of Labor Standards on behalf of the Department of Labor and Industrial Relations, State of Missouri.  All required reports, affidavits and substantiating evidence required shall be periodically furnished.  The highest rate listed for each category shall prevail.

13.9.2  The Contractor shall forfeit as a penalty to the Owner, Lincoln County R-III School District, the per day penalty amount specified by Missouri Revised Statutes 290.210 to 290.340, for each workman employed, for each calendar day (or portion thereof), such workman is paid less than the stipulated rates for any work done under this Contract by him or by any subcontractor under him.

13.9.3  All Contractor's bonds shall include such provisions as well as guarantee the faithful performance of the prevailing hourly wage clause as provided by this Contract.

13.9.4  Take cognizance of all complaints of all violations of provisions of the Prevailing Wage Law.  Section 290.250.

13.9.5  The Contractor shall make sure a clearly legible statement of all prevailing hourly wage rates to be paid to all workers employed in order to execute the contract and employed on the construction of the public works is kept posted in a prominent and easily accessible place at the site thereof by each contractor and subcontractor engaged in the public works projects under the provisions of this law and require that such notice shall remain posted during the full time that any worker shall be employed on the public works.  Section 290.265.

13.9.6  The Contractor shall make available for inspection periodically and when complaints are made the records that are required to be kept pertaining to the wages paid all workers employed in the construction of the public works.  Section 290.290.

13.9.7  The Contractor and subcontractors shall submit monthly, certified copies of their payrolls to the Owner.

13.9.8  The Contractor shall notify the Division of Labor Standards when a violation of the law is discovered so that proper notice of the violation can be made and the Attorney General alerted.

13.9.9  Before final payment is made, an affidavit must be filed by the Contractor stating that he has fully complied with the Prevailing Wage Law.
13.9.10 The Owner will withhold and retain therefrom all sums and amounts due and owing as a result of any violation of the Prevailing Wage Law. Section 290.250.

Add the following Subparagraphs 13.10 thru 13.10.10 after Subparagraph 13.9.10:

13.10 Equal Opportunity

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

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

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

13.10.1.3 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the labor union or worker's representative of the Contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

13.10.1.4 The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant order of the Secretary of Labor.

13.10.1.5 The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by an appropriate agency of the Federal Government and by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

13.10.1.6 In the event of the Contractor's noncompliance with the Equal Opportunity Conditions of this Contract or with any of such rules, regulations or orders, this Contract may be canceled, terminated or suspended in whole or in part; and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts, in accordance with procedures authorized in Executive Order No. 11246 on September 24, 1965; and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation or order of the Secretary of Labor, or as provided by law.

13.10.1.7 The Contractor will include all of Clauses 13.9.1.1 through 13.9.1.7 inclusive in every Subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each Subcontractor or vendor. The contractor will take such action with respect to any Subcontract or purchase order as the appropriate agency of the Federal Government may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event the Contractor becomes involved in or is threatened with, litigation to protect the interest of the United States.

13.10.1.8 Exemptions to the above Equal Opportunity conditions are Contracts and Subcontracts not exceeding $10,000 and Contracts and Subcontracts under which work is performed outside the United States where no recruitment of workers within the United States is involved.
13.10.1.9  Unless otherwise provided, the above Equal Opportunity provisions are not required to be inserted in Sub-subcontracts except for Sub-subcontracts involving the performance of construction work at the site of construction, in which case the provisions must be inserted in all such sub-subcontracts.

13.10.1.10  The Contractor shall submit Equal Opportunity Affidavits as provided in Appendix “E”.

Add the following Subparagraph 13.11 after Subparagraph 13.10.1.10:

13.11  Senate Bill No. 74 “Missouri Domestic Products Procurement Act”

13.11.1  The Contractor, all subcontractors, and material suppliers shall be required to comply with all provisions of the “Missouri Domestic Products Act” requiring use of products, materials, commodities, etc., produced in the United States except as modified or excluded by this act.

13.11.1.1  The Contractor shall submit to the Architect a written certificate identifying any material, commodity, product or manufactured item not manufactured in the United States and which, if purchased in the United States, would add more than 10% to the cost of the project, or that insufficient quantities are available for use on the project.

13.13  Criminal History Record

At the request of the Owner, Contractor shall submit, or cause to be submitted, to the Missouri State Highway Patrol a Criminal History Record Request Form for each and every employee, laborer, supervisor, foreman, or other person who will be present at the Project site during the performance of the Project, whether employed by Contractor or anyone working for or under Contractor. Contractor shall be responsible for paying all fees associated with the criminal background check(s). Contractor shall provide to Owner for Owner’s review the information received pursuant to all such requests. Owner shall have the right to prohibit any person(s) with a criminal background that is unacceptable, in the Owner’s sole judgment, from entering onto the Project site or from performing any work on the Project, whether for Contractor or any subcontractor. Contractor shall contact the chief law enforcement official of the county in which the Project is located and obtain a list of all registered sex offenders currently residing in that County. Contractor agrees that it will not employ, or allow any of its subcontractors to employ, any person whose name appears on the sex offender list.

13.14  “E-Verify” Missouri Statute

The Bidder should note that this Contractor shall comply with the Missouri Statute 285.530 title “E-Verify Addendum”.

13.15  “OSHA” Missouri Statute

This contract shall be subject to the construction safety provisions of Section 292.675 of the Missouri Revised Statutes, approved by the Missouri General Assembly in 2008. All bidders are required to become familiar with this law. These provisions shall become part of the contract between the Owner and the Contractor.

The Contractor to whom the contract is awarded and any subcontractors shall require all on-site employees to complete a ten-hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations (DOLIR). The DOLIR program must be at least as stringent as an approved OSHA program. All employees are required to complete the program within sixty (60) days of beginning work on the construction project.
Any employee found on a worksite subject to this section without documentation of the successful completion of the course required under subparagraph 2 above shall be afforded twenty (20) days to produce such documentation before being subject to removal from the project.

The Contractor shall forfeit as a penalty to the Owner, Lincoln County R-III School District, $2,500.00 (Two Thousand Five Hundred Dollars), plus $100.00 (One Hundred Dollars), for each employee employed by the Contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training. The penalty shall not begin to accrue until the time period is subparagraph 2 and 3 above of this section have elapsed. The Owner shall withhold and retain therefrom, all sums and amounts due and owing as a result of any violation of this section when making payments to the Contractor under the contract. The Contractor may withhold from any subcontractor, sufficient sums to cover any penalties the Owner has withheld from the Contractor resulting from the subcontractor’s failure to comply with the terms of this section. If the payment has been made to the subcontractor without withholding, the Contractor may recover the amount of the penalty resulting from the fault of the subcontractor in an action maintained in the circuit court of the county in which the public works project is located from the subcontractor.

13.16 Random Drug and Alcohol Testing

The contractor shall comply with the requirements of Section 161.371, RSMo, which stipulates that contractors or subcontractors on public works construction projects at public schools establish and implement a random drug and alcohol testing program. Any program must be administered by a certified laboratory and must require notification to the contractor/subcontractor and the contractor’s/subcontractor’s employee of the results of any positive drug and alcohol test. The school district must be notified of the action taken to protect the safety of the students as a result of a positive test. The contractor/subcontractor will pay for the costs of the program.

13.17 Missouri Department of Labor Checklist

Every transient employer as defined in section 285.230 RSMo. must post in a prominent and easily accessible place at the work site a clearly legible copy of the following: (1) the notice of registration for employer withholding issued to such transient employer by the director of revenue; (2) proof of coverage for workers compensation insurance or self-insurance signed by the transient employer and verified by the department of revenue through the records of the division of workers compensation; and (3) the notice of registration for unemployment insurance issued to such transient employer by the division of employment security. Any transient employer failing to comply with the requirements shall be liable for a penalty of $500 per day until the notices required by this section are posted as required by that statute.

END OF SECTION 00800
Paragraph 11.1 - “Contractor’s Liability Insurance”, shall be amplified by adding:

A. CONTRACTORS INSURANCE REQUIREMENTS (supplements Article 11 of AIA Document A201, 1997 Edition and other forms) THESE SPECIFICATIONS APPLY TO ALL CONTRACTORS WHO WILL BE ON THE JOBSITE, WHETHER A GENERAL CONTRACTOR OR ANY SUBCONTRACTOR.

INSURANCE: Contractor shall, at its expense, procure and maintain at a minimum for the duration of the Project and through the correction periods stated in the agreement, except as otherwise set forth herein, the types and amounts of insurance described below or as otherwise required by law on all of its operations, in companies registered to do business in the State of Missouri and having an A.M. Best Rating of A, V or higher:

1. Workers’ Compensation and Employers Liability Insurance.
   Contractor shall carry Workers’ Compensation Insurance as required by any applicable law or regulation. Employers Liability Insurance shall be in amounts no less than $1,000,000 each accident for bodily injury, $1,000,000 for bodily injury by disease and $1,000,000 each employee for bodily injury by disease. If there is an exposure of injury to Contractor’s employees under the U.S. Longshoremen’s and Harbor Workers Compensation act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims. If the contractor’s Employers Liability limits are below those stated above an umbrella liability policy may be used to the requested limit.

2. Commercial General Liability Insurance
   Contractor shall carry Commercial General Liability Insurance written on ISO occurrence form CG 00 01 07 98 or later edition (or a substitute form providing equivalent coverage) and shall cover all operations by or on behalf of the Contractor, providing insurance for bodily injury liability and property damage liability for the limits indicated below and for the following coverage:
   (1) Premises and Operations
   (2) Products and Completed Operations
   (3) Contractual Liability insuring the obligations assumed by the Contractor under this contract.
   (4) Personal Injury Liability and Advertising Injury Liability

Except with respect to bodily injury and property damage included within the products and completed operations hazards, the general aggregate limit shall apply separately to the Contractor’s project under this Contract. Completed Operations coverage must be maintained for the correction period provided by the agreement.

Limit of Liability.
The Commercial General Liability policy limits shall not be less than:
$1,000,000 Each Occurrence (Combined Single Limit for Bodily Injury and Property Damage)
$2,000,000 Aggregate for Products/Completed Operations
$1,000,000 Personal Injury/Advertising Injury
$2,000,000 General Aggregate (provide endorsement to apply the General Aggregate per project, if available. If not, see Umbrella Liability section.)
Additional Insured
The Owner, all of its officers, directors and employees, shall be named as Additional Insureds under the Commercial General Liability Insurance using ISO Additional Insured Endorsements CG 20 10 or substitute providing equivalent coverage. If additional insured status is required for a correction period then CG 20 37 or equivalent should also be used. These endorsements must be stated on the insurance certificate provided to the Owner and a copy of the endorsements confirming coverage should accompany the insurance certificate.

Primary Coverage
The Contractor’s Commercial General Liability Policy shall apply as primary insurance and any other insurance carried by the Architect or the Owner shall be excess only and will not contribute with Contractor’s insurance. This must be stated on the insurance certificate and a copy of the endorsement confirming coverage should accompany the insurance certificate.

3. Business Automobile Liability Insurance
The policy should be written on ISO form CA 0001, CA 0005, CA 0002, CA0020 or a substitute form providing equivalent coverage and shall provide coverage for all owned, hired and non-owned vehicles. The limit of liability should be at least $1,000,000 Combined Single Limit for Bodily Injury and Property Damage each accident and should also cover Automobile Contractual Liability. The policy should name the Owner and all of its officers, directors and employees as Additional Insureds. The policy shall be endorsed to be primary coverage and any other insurance carried by the Owner shall be excess only and will not contribute with Contractor’s insurance. To confirm coverage, a copy of the Additional Insured Endorsement and the Primary Insurance Endorsement should accompany the insurance certificate.

4. Umbrella Excess Liability
The Contractor should provide an umbrella excess liability policy that will provide a minimum of $2,000,000 per occurrence/$2,000,000 aggregate over the above listed coverages. This policy should “follow-form” of the underlying policies and comply with all insurance requirements of those policies. If the General Aggregate of the Commercial General Liability policy does not apply per project, the limits should be $3,000,000 per occurrence/$3,000,000 aggregate.

5. Waiver of Subrogation
The Commercial General Liability and Automobile Liability policies shall each contain a waiver of subrogation in favor of the Owner and its officers, directors and employees.

6. Certificates of Insurance
As evidence of the insurance, limits and endorsements required, a standard ACORD or equivalent Certificate of Insurance executed by a duly authorized representative of each insurer shall be furnished by the Contractor to the Owner and Architect before any Work under the Contract is commenced by the Contractor. Owner shall have the right, but not the obligation, to prohibit Contractor or any Subcontractor from entering the Project site until such certificates are received and approved by the Owner. With respect to insurance to be maintained after final payment, an additional certificate(s) evidencing such coverage shall be promptly provided to Owner as a precondition to final payment. The Certificate of Insurance shall provide that there will be no cancellation or reduction of coverage without 30 days prior written notice to the Owner. Failure to maintain the insurance required herein may result in termination of the Contract at Owner’s option. In the event the Contractor does not comply with the requirements of this section, the Owner shall have the right, but not the obligation, to provide insurance coverage to protect the Owner and Architect, and charge the Contractor for the cost of that insurance. The required insurance shall be subject to the approval of the Architect, but any acceptance of insurance certificates by the Architect or Owner shall in no way limit or relieve the Contractor of their duties and responsibilities in this Agreement.
7. **Copies of Policies.**  
Contractor shall furnish a certified copy of any and all insurance policies required under this Contract within ten (10) days of Owner’s written request for said policies.

8. **Subcontractors**  
Contractor shall cause each Subcontractor to purchase and maintain insurance of the types and amounts specified herein. Limits of such coverage may be reduced only upon written agreement of Owner. Contractor shall provide to Owner copies of certificates evidencing coverage for each Subcontractor. Subcontractors’ commercial general liability and business automobile liability insurance shall name Owner and Architect as Additional Insurees and have the Waiver of Subrogation endorsement added.

9. **Other Insurance.**  
The Owner may require insurance coverage in excess of the types and amounts required in this Exhibit. Contractor shall attempt in good faith to obtain quotes for such additional coverage and provide them to Owner for review. Contractor shall purchase any such additional insurance as may be requested by the Owner in writing. Owner shall pay any additional premium for such additional coverage.

END OF APPENDIX “A”
Missouri
Division of Labor Standards
WAGE AND HOUR SECTION

MICHAEL L. PARSON, Governor

Annual Wage Order No. 26

Section 057
LINCOLN COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Taylor Burks, Director
Division of Labor Standards

Filed With Secretary of State: ________________________________ March 8, 2019

Last Date Objections May Be Filed: April 8, 2019

Prepared by Missouri Department of Labor and Industrial Relations
<table>
<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
<th>** Date of Increase</th>
<th>Basic Hourly Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos Worker</td>
<td></td>
<td>$22.87*</td>
</tr>
<tr>
<td>Boilermaker</td>
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<tr>
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<td>Pile Driver</td>
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<tr>
<td>Electrician (Inside Wireman)</td>
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<tr>
<td>Electrician Outside Lineman</td>
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<td>$22.87*</td>
</tr>
<tr>
<td>Lineman Operator</td>
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<tr>
<td>Lineman - Tree Trimmer</td>
<td></td>
<td></td>
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<tr>
<td>Groundman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundman - Tree Trimmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator Constructor</td>
<td></td>
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<tr>
<td>Glazier</td>
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*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.*
### Heavy Construction Rates for LINCOLN County

<table>
<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
<th>** Date of Increase</th>
<th>Basic Hourly Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpenter</td>
<td></td>
<td>$22.87*</td>
</tr>
<tr>
<td>Millwright</td>
<td></td>
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<td>Pile Driver</td>
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<tr>
<td>Electrician (Outside Lineman)</td>
<td></td>
<td>$22.87*</td>
</tr>
<tr>
<td>Lineman Operator</td>
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<td></td>
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<tr>
<td>Lineman - Tree Trimmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundman</td>
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<tr>
<td>Groundman - Tree Trimmer</td>
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<td></td>
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<tr>
<td>Laborer</td>
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<td>$48.20</td>
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<td>Truck Driver</td>
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<td>$22.87*</td>
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<td></td>
<td></td>
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<tr>
<td>Group IV</td>
<td></td>
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</tr>
</tbody>
</table>

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.*
OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "overtime work" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.
Contractor’s Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO:

ADDRESS:

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

[ ] Corporation
[ ] Partnership
[ ] Individual
[ ] Joint Venture
[ ] Other

NAME OF PROJECT: (if applicable)
Project #18-16C —
Lincoln County R-III School District
Transportation Facility Renovation Package

TYPE OF WORK: (file separate form for each Classification of Work)

[ ] General Construction
[ ] HVAC
[ ] Electrical
[ ] Plumbing
[ ] Other: (Specify)

§ 1 ORGANIZATION
§ 1.1 How many years has your organization been in business as a Contractor?

§ 1.2 How many years has your organization been in business under its present business name?

§ 1.2.1 Under what other or former names has your organization operated?
§ 1.3 If your organization is a corporation, answer the following:
   § 1.3.1 Date of incorporation:
   § 1.3.2 State of incorporation:
   § 1.3.3 President’s name:
   § 1.3.4 Vice-president’s name(s)

   § 1.3.5 Secretary’s name:
   § 1.3.6 Treasurer’s name:

§ 1.4 If your organization is a partnership, answer the following:
   § 1.4.1 Date of organization:
   § 1.4.2 Type of partnership (if applicable):
   § 1.4.3 Name(s) of general partner(s)

§ 1.5 If your organization is individually owned, answer the following:
   § 1.5.1 Date of organization:
   § 1.5.2 Name of owner:

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

§ 2 LICENSING
   § 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

§ 2.2 List jurisdictions in which your organization’s partnership or trade name is filed.

§ 3 EXPERIENCE
   § 3.1 List the categories of work that your organization normally performs with its own forces.

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)
   § 3.2.1 Has your organization ever failed to complete any work awarded to it?

   § 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

   § 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?
§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

§ 3.4.1 State total worth of work in progress and under contract:

§ 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

§ 3.5.1 State average annual amount of construction work performed during the past five years:

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

§ 4 REFERENCES
§ 4.1 Trade References:

§ 4.2 Bank References:

§ 4.3 Surety:
§ 4.3.1 Name of bonding company:

§ 4.3.2 Name and address of agent:

§ 5 FINANCING
§ 5.1 Financial Statement.
§ 5.1.1 Attach a financial statement, preferably audited, including your organization’s latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;
Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

§ 6 SIGNATURE
§ 6.1 Dated at this day of

Name of Organization:

By:

Title:

§ 6.2

Sworn being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this day of

Notary Public:

My Commission Expires:
APPENDIX “D” - CONTRACTOR INFORMATION

PROJECT: LINCOLN COUNTY R-III SCHOOL DISTRICT
TRANSPORTATION FACILITY RENOVATION PACKAGE

The following information is to be filled in and returned with the bid. The Contractor Information submitted by the General Contractor on bid day shall be confirmed within twenty-four (24) hours after the bid date and time.

GENERAL CONTRACTOR: ______________________________

1. Percent of Lincoln County Labor: _____________%

2. Percent of Apprenticeship Training: _____________%

3. Can you provide a Statement of Insurance? _____________

4. Have you bid the Job Prevailing Wage? _____________

5. Are you Union Affiliated and if so, which unions? _____________

6. Are your Sub-Contractors Union Affiliated? _____________

7. List any Non-Union Affiliated Contactors: _____________

END OF APPENDIX “D”
APPENDIX “E” - FEDERAL WORK AUTHORIZATION PROGRAM (“E-VERIFY”) ADDENDUM

Pursuant to Missouri Revised Statute 285.530, all business entities awarded any contract in excess of five thousand dollars ($5,000) with a Missouri public school district must, as a condition to the award of any such contract, be enrolled and participate in a federal work authorization program with respect to the employees working in connection with the contracted services being provided, or to be provided, to the District (to the extent allowed by E-Verify). In addition, the business entity must affirm the same through sworn affidavit and provision of documentation. In addition, the business entity must sign an affidavit that it does not knowingly employ any person who is an unauthorized alien in connection with the services being provided, or to be provided, to the District.

Accordingly, your company:

a) agrees to have an authorized person execute the attached “Federal Work Authorization Program Affidavit” attached hereto as Exhibit A and deliver the same to the District prior to or contemporaneously with the execution of its contract with the District;

b) affirms it is enrolled in the “E-Verify” (formerly known as “Basic Pilot”) work authorization program of the United States, and are participating in E-Verify with respect to your employees working in connection with the services being provided (to the extent allowed by E-Verify), or to be provided, by your company to the District;

c) affirms that it is not knowingly employing any person who is an unauthorized alien in connection with the services being provided, or to be provided, by your company to the District;

d) affirms you will notify the District if you cease participation in E-Verify, or if there is any action, claim or complaint made against you alleging any violation of Missouri Revised Statute 285.530, or any regulations issued thereto;

e) agrees to provide documentation of your participation in E-Verify to the District prior to or contemporaneously with the execution of its contract with the District (or at any time thereafter upon request by the District), by providing to the District an E-Verify screen print-out (or equivalent documentation) confirming your participation in E-Verify;

f) agrees to comply with any state or federal regulations or rules that may be issued subsequent to this addendum that relate to Missouri Revised Statute 285.530; and

g) agrees that any failure by your company to abide by the requirements a) through f) above will be considered a material breach of your contract with the District.

By: ________________________________ (signature)

Printed Name and Title: ________________________________

For and on behalf of: ________________________ (company name)
EXHIBIT A

FEDERAL WORK AUTHORIZATION PROGRAM AFFIDAVIT

I, ________________________, being of legal age and having been duly sworn upon my oath, state the following facts are true:

1. I am more than twenty-one years of age; and have first-hand knowledge of the matters set forth herein.

2. I am employed by __________ (hereinafter “Company”) and have authority to issue this affidavit on its behalf.

3. Company is enrolled in and participating in the United States E-Verify (formerly known as “Basic Pilot”) federal work authorization program with respect to Company’s employees working in connection with the services Company is providing to, or will provide to, the District, to the extent allowed by E-Verify.

4. Company does not knowingly employ any person who is an unauthorized alien in connection with the services Company is providing to, or will provide to, the District.

FURTHER AFFIANT SAYETH NOT.

By: __________________________________ (individual signature)
For ____________________________ (company name)

Title: ____________________________

Subscribed and sworn to before me on this _____ day of ____________________, 20___.

__________________________________
NOTARY PUBLIC

My commission expires:

PROJECT NO. 18-16C – APPENDIX “E” - PAGE 2
1. GENERAL

1.1 SUMMARY OF WORK

A. The work of this contract comprises the Lincoln County R-III School District Transportation Facility Renovation Package.
B. Construct the work under a stipulated sum contract.
C. All work on the project, shall be executed as part of the work of this contract.

1.2 RELATED REQUIREMENTS

A. Section 00800 - Supplementary Conditions.
B. Section 01035 - Alteration Work Procedures.
C. Section 01700 - Contract Close-Out Procedures.

1.3 PROJECT COORDINATION

A. The Contractor shall coordinate the work, including the work of all subcontractors for the project.
B. The Contractor shall schedule and conduct progress meetings.
C. Note that the existing building on this site must remain in operation during construction and EVERY PRECAUTION MUST BE TAKEN TO PREVENT INTERRUPTION OF SERVICES.
D. All work which requires the interruption of existing utility services, to the existing building(s), shall be performed at times when the buildings are not in use by the Owner, and when the Contractor has received the prior approval of the Architect.
E. The Contractor is responsible for all overtime, weekend, or other premium time required to complete this project.
F. No trade items (i.e.: piping, ductwork, conduit, etc.) are to be installed below the HVAC Equipment. This will allow for maintenance and replacement of the HVAC Equipment in the future.
G. All HVAC units, controls, fire alarms, circuits, etc., shall be properly labeled with the appropriate room number. All HVAC equipment to include a plastic laminate I.D. applied sign. Same for Electrical panels.
H. Prior to start of field work, the Owner’s Representative shall hold a pre-construction conference at the site in a location to be designated, in order to discuss coordination, procedures, routing of delivery trucks, location of storage areas, requirements for Contractor’s parking of vehicles, barricades, security and scheduling. The Contractor shall inform the Owner of both the starting and completion dates of the site work prior to beginning any particular phase of work at the site.

1.4 JOB SITE PROGRESS MEETINGS

A. Job site progress meetings will be held weekly at a location to be determined and at a day and time agreed upon by the Contractor and Owner’s Representative. Other meetings may be held at the discretion of Owner’s Representative.
B. Attendance: Attendance at meetings will include, but not limited to, the following:

   (1) Owner’s Representative.
   (2) General Contractor’s Project Manager.
   (3) General Contractor’s Superintendent.
   (4) Subcontractors/material suppliers. Sub-subcontractors, those presently working on site.
   (5) Subcontractors/material suppliers. Those required on site within two weeks.
   (6) Subcontractors/material suppliers. Those requested by Owner’s Representative such as follows:

      (a) Earthwork
      (b) Plumber
      (c) Fire Protection
      (d) Electrician
(e) Mechanical  
(f) Temperature Control  
(g) Others as required or requested

C. Agenda: General Contractor shall chair the meeting and submit an agenda for each meeting which shall include the following:

<table>
<thead>
<tr>
<th>Attendance sheet</th>
<th>Request for Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval of previous meeting minutes</td>
<td>Problems/conflicts/field observations</td>
</tr>
<tr>
<td>Safety issues</td>
<td>Report from testing agency</td>
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<td>Accident reports</td>
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<tr>
<td>Submittal schedule/log</td>
<td>Old business</td>
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<tr>
<td>Report on submittals</td>
<td>Other business</td>
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<td>Report of progress since last meeting</td>
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<td>Schedule conformance</td>
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<tr>
<td>Request for proposals</td>
<td>Engineer(s) issues</td>
</tr>
<tr>
<td>Field work orders</td>
<td>General Contractor issues</td>
</tr>
</tbody>
</table>

Minutes: The General Contractor shall prepare minutes of all project meetings and shall issue the minutes in a timely manner, next day preferred but no later than two (2) days after the meeting. A draft copy of the minutes shall be forwarded to the Owner's Representative for his review, comments and corrections and these shall be incorporated into the minutes before the finalized minutes are issued. A copy of the minutes shall be sent by e-mail to those attending the meeting, the Architect when not attending, and others as directed by the Owner's Representative. Consultant Participants shall receive a copy when the subject of minutes pertains to them or their responsibility. Whenever a job site project meeting is attended by any Consultant Participants, that attendee will make a tour of the project and issue to Owner's Representative and Contractor his/her job site visit report in sufficient time to be reviewed and discussed before and during the next job site meeting.

D. Pre-Construction Documentation: The General Contractor shall maintain and keep available for review at their field office an album of pre-construction photos.

E. Daily Log and Weekly Field Report: The General Contractor will enter into his daily log all pertinent information from events, visitors, telephone calls, schedule items, job conditions, conversations, faxes or e-mails sent or received, etc., relating to the project. This log shall be dated and shall be written with ink instrument in a ringed tablet, such as or similar to stenographic notebook, and shall be kept in the Contractor's field office until project close out, at which time it will be filed with the project records.

F. Quality Control: Sample Classroom, Office or Conference Room

1. One room shall be constructed to aid in the finishing techniques of all taped joints, transitions, bulkheads, etc., to demonstrate the Contractor's workmanship.

2. This room shall also include finishes related to the ceiling tile and grid, floor finish, light fixtures, electrical and data items, fire protection items, HVAC, MB/TB, etc.

3. This room to be reviewed by the Owner, Architect, and Owner's Representative for approval of overall finishing.

1.5 SECURITY GUIDELINES

A. The Contractor shall be familiar with and adhere to the Owner's security guidelines and provisions.

B. Any workers(s) who violate security rules, disregard hazard signs, interfere with the Owner's operation, refuse to obey order(s) of the Owner's Representative, or are considered disorderly by the Owner's Representative shall be discharged from the work.

1.6 CUTTING AND PATCHING

A. The Contractor shall be responsible for all cutting, fitting, and patching, including attendant excavation and backfill required to complete the work or to:
(1) Make its several parts fit together properly.
(2) Uncover portions of the work to provide for installation of ill-timed work.
(3) Remove and replace defective work.
(4) Remove and replace work not conforming to requirements of the Contract Documents.
(5) Remove samples of installed work as specified for testing.
(6) Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
(7) Repair all damage caused by work under this contract.

B. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
C. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
E. Restore work which has been cut or removed; install new products to provide complete work in accordance with requirements of the Contract Documents.
F. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
   (1) For continuous surfaces, refinish to nearest intersection.
   (2) For an assembly, refinish entire unit.

1.7 BUILDING AND SITE LAYOUT

A. Establish a permanent benchmark on site referenced to data established by survey control points.
   (1) Record locations, with horizontal and vertical data, on Project Record Documents.
B. Establish lines and levels, locate and layout, by instrumentation and similar appropriate means:
   (1) Batter boards for structures.
   (2) Controlling lines and levels required for mechanical and electrical trades.
C. Care shall be exercised to maintain the stability of the present buildings and insure their safe operation and occupancy.
D. Before starting work, notify the Architect and discuss methods of procedure and execution of work. (Pre-Construction Conference)

1.8 BURIED UTILITIES

A. The Contractor shall verify that all utilities are marked prior to commencement of any excavation.

1.9 TEMPORARY UTILITIES

A. Furnish, install, and maintain temporary utilities required for construction; remove on completion of work.
B. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes, standards, or utility companies.
C. Temporary Electricity and Lighting:
   (1) Provide connections to existing facilities, size to provide service required for power and lighting; Owner will pay the cost of power used.
   (2) Provide electric services for construction purposes as specified in Division 16.
D. Temporary Heat and Ventilation:

(1) Provide temporary heat and ventilation as required to maintain adequate environment conditions to facilitate progress of the work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

(2) Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases. Pay all costs of installation, maintenance, operation and removal, and for fuel consumed.

   a) Contractor shall take note of and make accommodations for extended dehumidification times required by resilient flooring testing, approval, and installation.

(3) Portable heaters shall be standard approved units complete with controls. Salamanders will not be permitted.

E. Temporary Telephone Service

(1) Arrange with local telephone service company, provide direct line telephone service at the construction site for the use of the Architect and the Contractor.

(2) Coin-operated telephone will not be acceptable.

(3) Pay all costs for installation, maintenance and removal, and service charges for local calls.

F. Temporary Water

(1) Make connections to existing facilities, provide water for construction purposes; Owner will pay costs of water used.

(2) Install branch piping with taps located so that water is available throughout the construction by the use of hoses. Protect piping and fittings against freezing and vandalism.

G. Temporary Sanitary Facilities

(1) Provide sanitary facilities, in compliance with laws and regulations, at approved locations and screened to secure privacy.

(2) Service, clean, and maintain facilities and enclosures.

(3) Existing plumbing facilities shall not be used by construction personnel.

H. Drinking Water

(1) Furnish, without charge to subcontractors, adequate drinking water on the job site as long as the Contractor has personnel on the job requiring drinking water.

I. Use of Permanent HVAC System

(1) The contractors shall expedite activity on the permanent HVAC system so that it may be used to temper the enclosed building prior to completion, and as directed by the Architect. The contractors shall include in its bid any costs (extended warranties, etc.) that may be incurred to allow temporary usage of the system while maintaining the full term of the specified warranty after substantial completion. In addition, the HVAC contractor shall include in its bid any costs for temporary filters and maintenance required to deliver the system to the Owner in “like new” condition at the time of substantial completion.

(2) Refer to M.E.P. Specifications for additional information.

(3) All utility costs shall be paid by the Contractor.
1.10 CONSTRUCTION AIDS

A. Provide construction aids and equipment required by personnel and to facilitate execution of the
work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes,
chutes, and other such facilities and equipment.

(1) Refer to respective sections for particular requirements for each trade.

B. Provide protective coverings for finish surfaces of cars and entrances.

C. Maintain facilities and equipment in first class condition.

D. Hoisting Facilities:

(1) On single and two-story construction above grade, the Contractor and the individual
subcontractors shall provide their own hoisting for all their own materials.

(2) On construction three stories above grade or higher, the Contractor shall furnish a tower
hoist or other hoisting facility of suitable capacity to carry all normal items of material
going into the construction of the building and to furnish these hoisting facilities to
subcontractors who will conform to a schedule mutually agreeable to both parties during
the normal working hours; cost of the operator and fuel for the hoisting facilities shall be
paid for by the Contractor. Hoisting facilities shall be maintained until the bulk of all
materials are stored in the building.

(3) Hoisting facilities required for any materials which exceed the capacity of normal hoisting
facilities in either size or weight, or demand excessive time, shall be provided by the
individual subcontractor.

1.11 TEMPORARY ENCLOSURES

A. Provide temporary weathertight enclosure of exterior walls for successive areas of building as
work progresses, as necessary to provide acceptable working conditions, provide weather
protection for materials, allow for effective temporary heating, and to prevent entry of
unauthorized persons.

(1) Provide temporary exterior or interior doors with padlocks to secure areas required by
Owner.

(2) Other enclosures shall be removable as necessary for work and for handling of materials.

B. Provide temporary enclosures to separate work areas from areas of existing building occupied by
the Owner.

1.13 ACCESS ROADS AND PARKING AREAS

A. Provide and maintain all-weather vehicular access to the site and within the site to provide
uninterrupted access:

(1) To temporary construction facilities, storage, and work areas.

(2) For use by persons and equipment involved in construction of the project.

(3) For use by emergency vehicles.

B. Provide and maintain temporary parking facilities for use by construction personnel.

C. Remove temporary construction and facilities when no longer needed, and restore areas.

D. If rock is used, it may be placed along route shown on the drawings for paved drive, but shall not
be included as part of the rock paving base specified in Section 02500. If rock is not placed on
route of driveway, it shall be removed on completion and regraded with earth and the area
restored to the original condition to the satisfaction of the Architect.
1.14 JOB SIGN

A. Furnish and erect a job sign where directed by the Architect.
   (1) The sign shall be 4'-0" x 8'-0" minimum, of ¾" exterior grade plywood erected on three, 4" x 4" wood posts, all properly braced.
   (2) Text of sign shall be furnished by the Architect, but shall, in general, include the name of the project, the Owner, the Architect and Engineers, Contractors, etc.
   (3) Other signs will not be permitted on the site except as specifically approved by the Architect.

1.15 TEMPORARY FIELD OFFICE

A. Maintain and supervise use of designated existing spaces for offices; provide furnishings. Clean and restore spaces at completion of work.
B. Furnish, install, and maintain storage and work sheds needed for construction.
C. At completion of work, remove field offices, sheds, and contents.
D. The field offices shall be watertight and shall have a separate compartment having a minimum floor area of one hundred (100) square feet for use of the Architect.
   (1) The office facility shall be furnished with a work counter and plan rack for each space.
   (2) Office facility shall have adequate heat, ventilation, and light.

1.16 MATERIAL DELIVERY AND STORAGE

A. Arrange deliveries of products in accordance with construction schedules; coordinate to avoid conflict with work and conditions at the site.
   (1) Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
   (2) Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.
C. All materials, fixtures, and apparatus shall be protected from damage, whether incorporated into the building or not, by protective devices or coverings provided by the Contractor, unless otherwise specifically noted in individual sections.
D. Store products in accordance with manufacturer's instructions with seals and labels intact and legible.
   (1) Store products subject to damage by the elements in weathertight enclosures.
   (2) Maintain temperature and humidity within the ranges required by manufacturer's instructions.
E. Exterior Storage
   (1) Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
   (2) Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
G. Storage of materials shall be confined within the limits of construction area.
H. Prior to commencing work, the Contractor shall discuss location of storage areas with the Architect.

1.17 PROTECTION OF WORK

A. All materials, fixtures, and apparatus shall be protected from damage, whether incorporated into the building or not, by protective devices or coverings provided by the Contractor, unless otherwise specifically noted in individual sections.

B. PROTECTION OF FINISHED FLOORS: Contractor shall provide a suitable protective covering of all finished floors (whether wood, carpet or others) in areas where the work is being performed. No material handling equipment shall be permitted on or over finished floors unless said floors have been protected in a manner approved by the Owner’s Representatives.

C. Finished surfaces, materials, and installed devices and equipment shall be covered and protected against all damage, dirt, and demarcation, staining, dripping, or splashing.

D. Maintain in good condition protective devices placed by subcontractor who are no longer on the job.

E. Openings: Provide protective boxing around all entrances, openings, etc., used for construction purposes.

F. As the work progresses, provide and maintain adequate temporary means of protection.
   (1) Provide temporary wood doors and cloth or transparent plastic covered wood frames for exterior wall openings until the building has dried out.
   (2) Provide temporary railings, barricades, coverings, housings, planking, fencing, etc., for the protection of complete or partially completed work, and provide warning lights, guards, flashers, flags, etc., where required by laws or as required for safety.
   (3) Provide dust-tight closures to confine dust to localized areas.
   (4) Protect, as for new finishes, all adjacent properties from damage.

G. Keep excavated areas, trenches, pits, etc., free of water at all times until the completion of the work.

1.18 CLEANING

A. Execute cleaning during progress of the work and at completion of the work as required by the General Conditions.
   (1) The building premises, site, drives, parking areas, sidewalks, and adjoining streets shall be made neat and free of earth and debris resulting from this work.
   (2) The Contractor shall be responsible and pay for the periodic removal of all rubbish and debris from the building and job site.

B. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

C. Cleaning Materials:
   (1) Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
   (2) Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
   (3) Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

D. Subcontractor’s Responsibilities
   (1) Protecting equipment and finishes at the job site from damages from work under their control and for all cleaning required as a result of failure to protect, including removal of protective covers.
(2) Placing rubbish and debris in one pile on each floor. As soon as practical, the trowel trades will place all debris resulting from their work in one pile per room or per 50 lineal foot of wall.

E. Clean all exposed finish materials to remove extraneous paint and mortar. Do not disturb glazing compound.

1.19 RECORD DOCUMENTS

A. Maintain record documents as required by the conditions of the contract and these Specifications (See Section 01700, Contract Close-Out Procedures):

(1) The Contractor will be provided with one complete set of prints to be used exclusively as record drawings.
(2) These drawings will be marked "Project Record" and shall be maintained in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
(3) Record information concurrently with construction progress.
   (a) Do not conceal any work until required information is recorded.
(4) Drawings shall be legibly marked to record actual construction.
   (a) Depths of various elements of foundation in relation to finish first floor datum.
   (b) Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   (c) Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
   (d) Field changes of dimensions and details.
   (e) Changes made by Field Order or by Change Order.
   (f) Details not on original contract drawings.

B. Record drawings shall be submitted before Certificate of Substantial Completion is issued.

1.20 OPERATING MANUAL

A. Compile product data and related information appropriate for the Owner's maintenance and operation of the equipment furnished. See Section 01700, Contract Close-Out Procedures.
B. Submit to the Architect, for approval, one (1) copy of the Operating Manual bound in 3 ring 8½" x 11" vinyl binders, and one (1) thumb-drive of same.
C. Approved Operating Manuals shall be provided before the Owner's personnel are instructed in operating the equipment and before a Certificate of Substantial Completion is issued.
D. The Operating Manual shall include the following:

(1) Neatly typewritten Table of Contents.
(2) Neatly typewritten Contractor data including:
   (a) Name of Contractor.
   (b) Name of responsible principal.
   (c) Address.
   (d) Telephone number.
(3) A typewritten list of each piece of operating equipment with the name and addresses of the subcontractor or installer and a local source of parts.
(4) Equipment data, manufacturer's parts list, assembly drawings, and diagrams required for maintenance.
(5) Operating procedures.
(6) Maintenance procedures.
(7) As-installed control diagrams by control manufacturer.
(8) As-installed piping diagrams; charts of valve tag numbers, valve locations, and valve function.
(9) Panel board index sheets.
(10) Warranties, bonds, and service contracts.
(11) Programming of Owner’s final room numbers for the fire alarm system, electrical panels, AHU units, VAV boxes, and smoke detectors.

1.21 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment, and systems. See Section 01700, Contract Close-Out Procedures.
B. Operating and maintenance manual shall constitute the basis of instruction.

(1) Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

1.22 EXISTING FACILITIES

A. If it is necessary in the prosecution of the work to interrupt existing surface drainage, sewers, conduits, utilities, or similar underground structures, or parts thereof, the Contractor shall be responsible for and take all necessary precautions to protect and preserve or provide temporary services for same.
B. When such facilities are encountered, the Contractor shall notify the Architect who shall arrange for their removal or adjustment, if necessary. The Contractor shall, at his own expense, satisfactorily repair all damage to such facilities or structures which may result from his operations or from negligence during the period of the contract.
C. Existing paving of all kinds, which is not involved in work under the contract, but which may be damaged due to delivery of materials, shall be repaired; and on completion of the work, shall be left in the same or better condition as when construction started. Replace concrete to nearest joint.

1.23 EXISTING MATERIALS

A. Except as specifically indicated or specified, materials and equipment removed from the existing structure shall not be used in the completed work, and shall be removed from the site.
B. For material and equipment specifically indicated or specified to be reused in the work:
   (1) Use special care in removal, handling, storage, and reinstallation to assure proper function in the complete work.
   (2) Arrange for transportation, storage, and handling of products which require off-site storage, restoration, or renovation. Pay all costs for such work.

1.24 MANUFACTURERS' INSTRUCTIONS

A. When Contract Documents require that installation of work comply with manufacturers’ printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to the Architect.
   (1) Maintain one set of complete instructions at the job site during installation and until completion.
B. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformity with specified requirements.
   (1) Should job conditions or specified requirements conflict with manufacturers' instructions, consult with the Architect for further instructions.
(2) Do not proceed with work without clear instructions.

C. Perform the work in accordance with the manufacturers' instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

END OF SECTION 01000
SECTION 01020 – ALLOWANCES

1. GENERAL

1.1 REQUIREMENTS INCLUDED

A. Include in the Contract Sum all allowances stated in the Contract Documents, or as listed below.
B. Designate in the construction progress schedule the delivery dates for products specified under each allowance.

1.2 ALLOWANCES FOR PRODUCTS

A. The amount of each allowance includes:
   (1) The cost to the Contractor, less any applicable trade discounts, of the materials and equipment required by the allowance.
   (2) Delivery to the site.
   (3) All applicable taxes.
B. The following Contractor's costs shall be included in the Contract Sum and not in the allowance:
   (1) Handling at the site; including unloading, uncrating, storing, and protecting.
   (2) Labor including installation and finishing, except where labor is specified to be included in the allowance.
   (3) All other expenses required to complete the installation.
   (4) Contractor's and subcontractors overhead and profit.

2. ALLOWANCES

2.1 CONTINGENCY ALLOWANCE

A. Include in the Contract Sum a Lump Sum Contingency Allowance of $25,000.00 (Twenty-Five Thousand Dollars).
   (1) Do not include any additional amounts for installation, overhead, or profit in the Contract Sum. Change orders will include such additional amounts as provided in the conditions of the Contract.
B. Monies in this Contingency Allowance will be used only on issuance of change orders.
C. At the completion of the contract, monies remaining in the Contingency Allowance will be credited to the Owner by change order.

3. EXECUTION

3.1 GENERAL

A. Contractor's responsibility for purchase, delivery and installation.
   (1) The Architect will notify the Contractor in writing of the product selection and designated supplier.
   (2) The Contractor, upon receipt of such notification, shall execute a purchase agreement.
   (3) The contractor shall arrange for and process shop drawings, product data, and samples as required.
B. Adjustment of Costs
   (1) Whenever the cost is more or less than the allowance, the Contract Sum shall be adjusted accordingly by change order.
(a) The amount of the change order will recognize any changes in handling costs at the site, labor, installation costs, overhead, profit, and other expenses.
(b) For products specified under a unit cost allowance, the unit cost shall apply to the quantities actually used with a nominal allowance for waste, as determined by receipted invoices, or by field measurement.

END OF SECTION 01020
1.1 REQUIREMENTS INCLUDED

A. Coordinate work of trades and schedule elements of alterations and renovation work by procedures and methods to expedite completion of the work.

B. In addition to demolition specified elsewhere, and that specifically shown, cut, move or remove items as necessary to provide access or to allow alterations and new work to proceed. Include such items as:

   (1) Repair or removal of hazardous or unsanitary conditions.
   (2) Removal of abandoned items and items serving no useful purpose, such as abandoned piping, conduit and wiring.
   (3) Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.
   (4) Cleaning of surfaces, and removal of surface finishes as needed to install new work and finishes.

C. Patch, repair and refinish existing items to remain, to the specified condition for each material, with a workmanlike transition to adjacent new items of construction.

1.2 RELATED REQUIREMENTS

A. Section 01000 - General Provisions.
B. Section 01040 - Equipment Relocation.
C. Section 01100 - Reserved Items
D. Section 02050 - Demolition.
E. Sections 2 through 12 - As applicable.

1.3 SCHEDULES

A. Submit separate detailed sub-schedule for alteration work, coordinated with the construction schedules.

1.4 ALTERATIONS, CUTTING AND PROTECTION

A. Assign the work of moving, removal, cutting and patching to trades qualified to perform the work in a manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.

B. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work.

   (1) Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division, and/or review potential toothing of new masonry in existing masonry walls as necessary to create new openings or partition layout changes where applicable.

C. Perform cutting and patching as specified in Section 01000.
D. Protect existing finishes, equipment, and adjacent work which is scheduled to remain, from damage.

   (1) Protect existing and new work from weather and extremes of temperature.

      (a) Maintain existing interior work above 50°F, or higher if required for specific construction installation or finish materials requirements.
(b) Provide weather protection, waterproofing, heating or cooling and humidity control as needed to complete all new work and/or prevent damage to remaining existing work in-place.

2. PRODUCTS

2.1 SALVAGED MATERIALS

A. Salvage sufficient quantities of cut or removed material to replace damaged work of existing construction, when material is not readily obtainable on current market.

(1) Use particular care in removal and salvage of the following items:
   (a) Items as designated on the drawings.

(2) Store salvaged items in a dry, secure place on site so designated by the Owner.

(3) Items not required for use in repair of existing work shall remain the property of the Owner when designated on the drawings or specified herein. All other removed material shall be removed from the site and properly disposed of at the expense of the Contractor.

(4) Do not incorporate salvaged or used material in new construction except where indicated on the drawings, or with permission of the Architect/Engineer.

2.2 PRODUCTS FOR PATCHING, EXTENDING, AND MATCHING

A. General requirements that work be complete:

(1) Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.
   (a) Generally, Contract Documents will not define products or standards of workmanship present in existing construction. Contractor shall determine products by inspection and any necessary testing and workmanship by use of the existing as a sample of comparison.

(2) Presence of a product, finish or type of construction, requires that patching, extending or matching shall be performed as necessary to make Work complete and consistent to identical standards of quality.

3. EXECUTION

3.1 PERFORMANCE

A. Patch and extend existing work using skilled mechanics that are capable of matching existing quality of workmanship. Quality of patched or extended work shall not be less than that specified for new work.

B. Where necessary, installation of patch work shall begin at the nearest inside or outside corner of finish materials, if such added areas are required to be patched so as to obtain visually acceptable finish condition. Cutting and patching in concrete block or masonry material is permitted with matching masonry and mortar color where exposed. Painting full wall surface to nearest inside or outside corner will be required if a small painted patch area is visible. Application of a textured surface for patching is permitted when the finish texture of the patched area is not readily visible. Final acceptance of patched areas shall be reviewed and approved by the architect. The contractor shall request inspection of sample patch areas prior to proceeding with full installation of areas.
3.2  DAMAGED SURFACES

A. Patch and replace any portion of an existing finished surface which is found to be damaged, lifted, discolored, or shows other imperfections with matching material.

   (1) Provide adequate support of substrate prior to patching the finish.
   (2) Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
   (3) When existing surface finish cannot be matched, refinish entire surface to nearest intersections, and/or inside or outside corner.

3.3  TRANSITION FROM EXISTING TO NEW WORK

A. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance so that the patch or transition is invisible at a distance of five feet. See Performance Section. Review specific field conditions with the Architect prior to proceeding with finish work where necessary.

   (1) When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface.
   (2) If necessary Contractor will install trim material such as finished wood (painted or stained), or break metal (painted or prefinished, or other applicable material, etc. between a transition from existing to new if required to achieve a finished appearance or address offset plane alignment or similar issue.
   (3) Installation of a drywall or plaster control joint or installation of a finished caulk joint may be applicable. Review conditions with Architect.

3.4  CLEANING

A. Perform periodic and final cleaning as specified in Section 01000 or Section 02050.

   (1) Clean Owner-occupied areas daily.
   (2) Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

C. At completion of alterations work in each area, provide final cleaning and return space to a condition suitable for use by Owner. Perform additional cleaning as directed by the Architect, when the Contractor has not provided adequate protection of the Owner's facility.

   (1) Final cleaning shall include vacuuming, sweeping, mopping if floors as required.
   (2) Cleaning of all glass and frames, inside and exterior.
   (3) Removal of all markings, stickers, labels, finger prints, dust and markings.
   (4) Thorough interior cleaning of all spaces, casework, etc.
   (5) Thorough removal of all exterior debris and clear deleterious materials from all areas and surfaces, including sweeping, power blowing and or vacuum removal if required.

END OF SECTION 01035
1.1 RELATED REQUIREMENTS

A. Conditions of the Contract.
   (1) Article 6: Work by Owner or by separate Contractors.

1.2 RESERVED ITEMS

A. The following items are reserved by the Owner:
   (1) All items marked "N.I.C." (Not In Contract).
   (2) Loose furnishings and equipment, other than specifically noted in the Contract Documents.
   (3) Draperies, curtains, blinds, shower curtains, or related hardware, unless specifically noted otherwise.
   (4) Paper towels and dispensers, soap dispensers, soap for dispensers and other miscellaneous janitors' supplies.
   (5) Telephone installation.
   (6) Work not scheduled on Room Finish Schedule unless noted otherwise.
   (7) Padlocks for lockers.
   (8) Removal of loose furnishings and equipment from existing areas.
   (9) Concrete floor staining and sealant work.
   (10) Resilient wall base.
   (11) Sidewalks and site work.
   (12) Fence work.
   (13) Ice maker.

END OF SECTION 01100
**1. GENERAL**

1.1 SCOPE

A. The Contractor shall submit, in accordance with the General Conditions and these specifications, all items indicated on this matrix and as required in the Contract Documents.

B. The Contractor shall include with their submittals the attached paint submittal reference sheet for Specification Section 09900, Painting and Finishing.

C. The Contractor shall include the attached shop drawings submittal cover sheet with all their submittals.

1.2 MATRIX

A. Schedule of Items (Note - See individual sections for special guarantees).

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Shop Drawings or Schedules</th>
<th>Field Sample Panels</th>
<th>Catalog Data</th>
<th>Color Selection Samples</th>
<th>As-Built Drawings</th>
<th>Operating Manuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item No. 1:</td>
<td>Shop Drawings or Schedules</td>
<td>Field Sample Panels</td>
<td>Catalog Data</td>
<td>Color Selection Samples</td>
<td>As-Built Drawings</td>
<td>Operating Manuals</td>
</tr>
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</table>

B. Matrix

<table>
<thead>
<tr>
<th>DIVISION</th>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
<th>#5</th>
<th>#6</th>
<th>REMARKS</th>
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<tr>
<td>01400 – SPECIAL INSPECTIONS AND TESTING</td>
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</table>
1.2 MATRIX (CONTINUED)

A. Schedule of Items (Note - See individual sections for special guarantees).

- Item No. 1: Shop Drawings or Schedules
- Item No. 2: Field Sample Panels
- Item No. 3: Catalog Data
- Item No. 4: Color Selection Samples
- Item No. 5: As-Built Drawings
- Item No. 6: Operating Manuals

B. Matrix

<table>
<thead>
<tr>
<th>DIVISION</th>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
<th>#5</th>
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</table>
1.3  **PAINT SUBMITTAL REFERENCE SHEET**

A. See attached sheet. Painting Contractor to submit this document with shop drawings.

**PAINT SUBMITTAL REFERENCE SHEET**
(To be submitted with paint submittal)

<table>
<thead>
<tr>
<th>Architects Finish Number</th>
<th>Product Submitted</th>
<th>Product Name</th>
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</table>
SHOP DRAWING SUBMITTAL

PROJECT: Lincoln County R-III School District
Transportation Facility Renovation Package

PROJECT NUMBER: 18-16C

GENERAL CONTRACTOR: Name
Address
Phone

ARCHITECT: Hoener Associates, Inc.
6707 Plainview Avenue
St. Louis, Missouri 63109
(314) 781-9855

DATE OF SUBMITTAL: Month, 00, 0000

SUBCONTRACTOR/SUPPLIER: Name
Address
Phone

SPECIFICATION SECTION: 00000 Section Name

PRODUCTS: Product
Product
Product
Product

CONTRACTOR’S REVIEW

ARCHITECT/ENGINEER’S REVIEW

END OF SECTION 01300
SECTION 01400 - SPECIAL INSPECTIONS AND TESTING

1. GENERAL

1.1 The Owner shall retain and incur the cost of a Special Inspection and Testing Agency for the purpose of field inspection as defined herein and in the contract documents.

A. This Contractor shall be responsible for notifying the Architect, Engineers, and Testing Agency to arrange for inspection and/or testing prior to proceeding with any further related work.

B. All areas requiring inspection and/or testing shall receive written certification and approval by the Testing Agency Engineer prior to proceeding with any further work.

C. The Contractor shall notify the Testing Agency Engineer a minimum of 24 hours in advance of commencing all work requiring inspection.

D. Costs for re-inspection and additional testing of failed inspected items will be charged to the General Contractor.

1.2 The following is a summary of the special inspections and testing outlined in the Construction Documents.

A. STRUCTURAL STEEL

(1) The following tests are required:

(a) Shop and Field Welding: Perform visual inspections of all welds. In addition to visual inspections, 10% of field-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency’s option:

1) Liquid Penetration Inspection: ASTM E-165.
2) Magnetic Particle Inspection: ASTM E-709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3) Ultrasonic Inspection: ASTM E-164.
4) Radiographic Inspection: ASTM E-94.

(b) Bolted Connections: Perform test on all bolted connections in accordance with AISC specifications.

1) If high strength tension set fasteners are used, the bolted connections do not require testing.

(2) Visual inspections and testing are to be performed by the Testing Agency.

(3) Reports of visual inspections and test results shall be filed as follows:

(a) Two (2) copies filed with the Architect.
(b) One (1) copy filed with the Contractor at the job site.
(c) One (1) copy filed with the Contractor’s office.

B. CONCRETE

(1) Test procedures shall conform to the following ASTM Specifications:

(a) C-143 Slump Test
(b) C-31 Making and curing of field cylinders
(c) C-192 Making and curing of laboratory cylinders
(d) C-39 Cylinder Test
(e) C-231  Testing air content of fresh concrete by pressure method
(f) C-172-71  Sampling fresh concrete

(2) The following tests and inspections are required:

(a) Visual inspection of reinforcing steel shall be made one per 100 ft. of grade beam or foundation wall and at 20% of isolated column footings.
(b) Slump: One test for each set of test cylinders and one test for each load at point of discharge.
(c) Compressive Strength: Two sets of three cylinders for each 50 cu. yds. or each days pour. Test one cylinder from each set at 7 days, another at 28 days, and retain one cylinder from each set for additional testing as required. Cure all cylinders under job conditions (ASTM C-31-Par. 7.4).
(d) Air Content: One test for each set of test cylinders and one test for each load at point of discharge. The provisions of ASTM C-94 shall apply for acceptance of air content of concrete.

(3) In-Place Test: Where questions exist as to quality of concrete placed, the Architect may require tests per ASTM C-42 or ASTM C-805. If tests confirm deficiency, the Architect reserves the right to require the demolition and replacement of the affected work at no extra cost to the Owner.

(4) The Contractor shall be responsible for delivery of test cylinders to the laboratory.

(5) Testing to be performed by the Testing Agency.

(6) Test results shall be filed as follows:

(a) Two (2) copies filed with the Architect.
(b) One (1) copy filed with Contractor at the job site.
(c) One (1) copy filed with the Contractor's office.

C. MASONRY

(1) The following tests, verification, and data are required:

(a) Mix designs for each type of mortar and grout:
   1) Include description of type and proportions of ingredients.
   2) Test the following once per 5,000 s.f. of wall area:
      a) Mortar Test (Property Specification): Per ASTM C-780.
      b) Grout Test (Compressive Strength): Per ASTM C-1019.

(b) Masonry Units:
   1) Submit material test reports substantiating compliance with the compressive strength requirements.

(c) Cold Weather Procedures:
   1) Submit a detailed description of methods, materials, and equipment to be used to comply with cold weather requirements.

(d) Periodic Inspection:
   1) The following inspections shall be made at least once every 5,000 s.f. of wall.
      a) Location and size of reinforcing.
      b) Type, size, and location of anchors.
c) Proportions of site prepared grout.

(e) Continuous Inspection:

1) The following inspections shall be continuous:

   a) Grout placement.

(2) Mix designs and test reports shall be filed as follows:

   a) Two (2) copies filed with the Architect.
   b) One (1) copy filed with Contractor at the job site.
   c) One (1) copy filed with the Contractor’s office.

END OF SECTION 01400
SECTION 01700 - CONTRACT CLOSE-OUT PROCEDURES

1. GENERAL

1.1 RELATED AND INCLUDED REQUIREMENTS

A. Comply with requirements stated in the conditions of the Contract and in specifications for General Provisions.

1.2 SUBSTANTIAL COMPLETION PROCEDURE

A. When the Contractor considers that the project, or a designated portion thereof which is acceptable to the Owner, is substantially complete, as defined in the conditions of the Contract, the Contractor shall prepare for submission to the Architect:

(1) Written notice that the project, or acceptable designated portions thereof, is substantially complete.

(2) All operating manuals (three copies), record drawings, and balancing report (see General Provisions).

B. Within a reasonable time after receipt of material as stated in 1.2, A, the Architect will make an inspection to determine the status of completion, (Inspection List) and prepare a Certificate of Substantial Completion for the Owner's and Contractor's written acceptance.

C. At this time a meeting will be set up with the Owner's representative, Architect, Engineer, General Contractor and required Subcontractor(s) to review the operation of the equipment and systems installed. It is at this time the record drawings and operating manual will be reviewed and turned over to the Owner.

1.3 FINAL INSPECTION PROCEDURE

A. When the Contractor considers that the project is complete, he shall submit written certification that:

(1) The Contract Documents have been reviewed.

(2) The project has been inspected by the Contractor for compliance with the Contract Documents.

(3) The project has been completed in accordance with the Contract Documents.

(4) Equipment and systems have been tested in the presence of the Owner's representative and are operational.

(5) The project is complete and ready for final inspection.

B. Within a reasonable time after receipt of such notice, the Architect will make an inspection to determine the status of completion.

C. Should the Architect consider the project incomplete or defective:

(1) The Architect will notify the Contractor in writing, listing the incomplete or defective portion of the project.

(2) The Contractor shall take immediate action to remedy the stated deficiencies, and send to the Architect, a second written Certification that the project is complete and ready for re-inspection.

(3) The Architect will re-inspect the project.
1.4 CONTRACTORS SHALL SUBMIT THE FOLLOWING CLOSE-OUT SUBMITTALS TO THE ARCHITECT:

A. Evidence of compliance with requirements of governing authorities:
   (1) Certificate of Occupancy (Occupancy Permit).
       (a) or letter stating not applicable.
   (2) State Fire Marshal’s inspection/permit/certificate.
       (a) or letter stating not applicable.

B. Final waivers of lien, signed and notarized.
C. Special warranties.
D. Consent of Surety Company to Final Payment.
E. Final Application for Payment, signed and notarized.
F. Letter of certification that no asbestos containing products were incorporated in this project.
G. Wage rate affidavits, signed and notarized.
H. Maintenance and operations manuals, as required by Specification Section 01300 Matrix.
I. Written verification of demonstration to the Owner of systems installed by the contractor, as required by the specification.
J. Approved record (as-built) drawings (Architectural, Structural, Mechanical, Electrical, Plumbing, and Fire Protection).
K. Refer to Section 01300, Matrix of Submittals, and each Specification Section for a listing of Specification Sections required for warranties, testing, reports, etc., to be included in the close out submittal.
L. Refer to Mechanical, Electrical, and Plumbing (MEP) for additional close out submittals:
   (1) HVAC Test and Balance Reports.
   (2) Temperature Controls record drawings (as-built’s) wiring diagrams, sequences of operation with daily holding, and special operating schedules, and final calibrations of all instruments.
   (3) Valve tag list.
   (4) Letter stating all materials meet the specified ASTM E-84 flame/smoke rating of 25/50, and that all piping and duct penetrations are smoke or fire stopped as required by the code.
   (5) Equipment tag list.
   (6) Letter stating all electrical panels and circuits have been labeled.
   (7) Letter stating all HVAC and electrical items have been labeled (i.e., smoke detectors, VAV boxes, AHU, fire alarm devices, RTU, exhaust fans, etc..) with proper room number and identification.

M. A final report of special inspections and testing documenting completion of all required inspections and correction of failed inspection items.

Prior to the General Contractor’s final Application for Payment being certified by Project Architect, all close out documentation must be reviewed and approved, and all field work inspection items completed.

END OF SECTION 01700
SECTION 02050 – DEMOLITION

1. GENERAL

1.1 SCOPE

A. This work includes all labor, materials, and equipment required to complete all demolition work as described on the drawings and specified herein. Work included is as follows:

(1) Removal of parts of building as indicated on the drawings.
(2) Cut new openings.
(3) Provide protective materials and devices.
(4) Remove debris from site.
(5) NESHAP notification for demolition.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01035 - Alteration Work Procedures.
(3) Section 01100 - Reserved Items.
(4) Section 02200 - Excavating, Etc.
(5) Section 03100 - Concrete and Cement Work.
(6) Section 04200 - Masonry and Mortar Materials.
(7) Section 06100 - Carpentry.
(8) Division 15 - Removal of heating devices and pipes.
(9) Divisions 15 & 16 - Cutting of holes in existing building for new mechanical/electrical equipment installation.
(10) Division 16 - Removal of lighting fixtures and electrical devices.

1.2 GENERAL INSTRUCTIONS

A. Before starting demolition work, notify the Architect and discuss methods of procedure, and then execute work in accordance with the acceptable methods. The Contractor remains responsible for the safe removal and demolition of all required existing materials to complete the project.

B. Work shall be so scheduled as to not interfere with normal operations of the building.

1.3 PROTECTION

A. Provide dust-tight frames, where directed by the Architect, for closing openings as required to restrict dust to localized areas.

B. Protect existing utilities which are to remain.

C. Plaster, windows, doors, devices, etc., which are not to be removed, reworked, or reconditioned under the Contract, shall be completely protected from damage.

D. Debris shall be kept damp until removed from the site.

E. Materials which are to be reused in new construction shall be stored in a protected area until reinstalled.

2. PRODUCTS

2.1 PROTECTIVE MATERIALS

A. Planking, bracing, shoring, needles, and other devices of sufficient strength to support all loads imposed shall be provided under this section.

B. Provide all necessary wood framing, 2 x 4 minimum, and sound plywood to provide temporary partitions between existing areas and areas to be demolished. Review location with Architect prior to erection. All exposed faces of plywood shall be painted with fire-resistive intumescent paint. Reinforced plastic over treated wood frames is also approved. Review with the Architect.
3. EXECUTION

3.1 GENERAL

A. Demolition work shall be executed in an orderly and careful manner.
B. Masonry shall be removed in small sections; brace and needle where necessary to maintain stability of remaining building and insure safe operations and occupancy of same.
C. Material shall not be dropped or dumped over side of building; chutes or other safe means of lowering shall be used.
D. Care shall be taken in cutting into existing areas which are to remain to prevent damaging adjoining materials. Leave all finish materials with clean cuts to receive new work. All interior cutting of concrete and masonry shall be done wholly or partially with a concrete saw, where possible, to provide clean breaks for new openings.
E. Loose lintels shall be set and bricked in under Section 04200, but bracing and needling of openings shall be part of demolition work.
F. Install temporary partitions before removing any parts of the building.
G. Patching of surfaces shall be by the relevant trade. Leave all holes, damaged areas, etc., free of all loose material, anchors, etc., and ready for patching by other trades.

3.2 PATCH WORK

A. All existing spaces noted to be finished (painted) shall be patched and repaired, including cracks above and around doors, windows, any patchwork of old mounting holes from items removed under this project and items previously removed, and cracks in corners where partitions intersect, etc. Method of patching shall include plaster, joint compound, caulking, or mortar. All finished shall match existing and be paintable.

3.3 DISPOSAL

A. All material removed, including brick batts, wood, wood chips, broken concrete, rubbish and any other material not being reused shall become the property of the Contractor and shall be removed from the site at the Contractor's expense; accumulation of rubbish will not be permitted.
B. The following items shall remain the property of the Owner and shall be removed and stored in a location designated by the Owner:

(1) Doors, door frames, and hardware.
(2) Light fixtures.
(3) Items designated on the drawings.

C. The following items shall be salvaged for reuse in new work:

(1) Items designated on the drawings.

END OF SECTION 02050
1. GENERAL

1.1 SCOPE

A. Provide all labor, equipment, and materials necessary to execute the following:

(1) All excavation for building work.
(2) Excavation for wall footings.
(3) Fill under slabs on grade.
(4) All compaction work as required.
(5) Disposal of excess material, including hauling from site.
(6) Hand work as required.
(7) Miscellaneous items as noted.
(8) Multiple trips to the Site.

B. The following description briefly outlines the scope of work covering the removal of unsatisfactory soil types present at the project site and related work:

(1) Specific sequence of operations to achieve the required work shall be the responsibility of this Contractor.
(2) All excess dirt shall be removed from the site as part of this contract.

C. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 02050 - Demolition.
(3) Section 03100 - Concrete and Cement Work.
(4) Excavating and backfilling of trenches for sewers and other services, and spreading of dirt resulting from utility ditching within the building, specified under Mechanical and Electrical Divisions. (EXCEPT FOR CLASS I AND CLASS II ROCK REMOVAL WHICH SHALL BE COVERED UNDER THIS SECTION.)

D. This specification assumes that all Class III and Class IV material, as defined herein, in any quantity encountered and as required to complete the work indicated on the drawings and specified herein, shall be excavated, graded, compacted, hauled to or removed from the site, etc., as required to complete all the work.

E. Class I and Class II rock material, as defined herein, if encountered, shall be removed as required on a Change Order basis.

F. If quicksand is encountered, special provisions will be necessary and the cost reviewed with the Architect before proceeding with the work.

1.2 DEFINITIONS

A. Definitions of soil and rock classifications are as follows:

Class I: Solid "Field" rock excavation is defined and shall include all solid rock in ledges, embedded deposits, in unstratified masses, in conglomerate deposits or boulders so firmly cemented as to present all the characteristics of solid rock, stratified in layers greater than four inches (4") thick between seams of ledge rock, and any material where each piece is greater than one cubic yard in volume such as boulders, detached pieces of limestone, hard sandstone, most shales, soft sandstone or rubble, and which require the use of drilling, blasting, or continued use of pneumatic jackhammers for removal in areas 5'-0" wide or greater. All material which can be removed and loaded with normal power operating excavation equipment, including bulldozers and front end loaders, shall not be classified as Class I rock.
Class II: Solid "Trench" rock excavation is defined and shall include all solid rock in ledges, embedded deposits, in unstratified masses, in conglomerate deposits and/or boulders so firmly cemented as to present all the characteristics of solid rock, stratified in layers greater than 4" thick between seams of ledge rock, and any material where each piece is greater than one cubic foot in volume such as boulders, detached pieces of limestone, hard sandstone, most shales, soft sandstone or rubble and which require the use of drilling, blasting, or continued use of pneumatic jackhammers for removal in areas less than 5'-0" wide. All materials which can be removed and loaded with normal power operated excavation equipment including front end loaders and backhoe and intermittent use of pneumatic jackhammer shall not be classified as Class II rock.

Class III: Loose rock and hard shale that is not solid, is in excess of six inch (6") cube and requires hand work and pneumatic tools for removal, all boulders less than one cubic yard in volume, embedded in soil or gravel, and all stratified rock in layers of less than four inches (4") between seams, and which can be removed with normal power operated excavation equipment, including bulldozers, front end loaders, and backhoes.

Class IV: Earth excavation is defined as clay, loam, and sandy soil, and normal earth plus loose rock, and shall include all materials other than Class I and Class II material, exclusive of quicksand, and shall specifically include loose rock and hard shale in veins of four inches (4") or less.

1.3 MEASUREMENT

A. An accurate record of all Class I and Class II rock encountered and stabilized soil, or any other material as required shall be maintained by the Contractor. No payment will be made without such record.

B. Material quantities shall be calculated as the volume of the excavated areas figured according to the following:

(1) For Class I and Class II material, area shall be figured to the outer edge of footings, plus one foot (1') to the width of the footing, when directed by the Architect and/or Engineer, to a depth of one of the following: bottom of footing or as directed otherwise by the Architect and/or Engineer.

(2) For Class I and Class II material, area shall be figured to the exterior face of walls if no footing occurs and rock presents a neat and stable surface to act as a form and permitted by the Architect and/or Engineer, or if not permitted by the Architect or Engineer and not neat and stable, allow twenty-four inches (24") for forms on each side.

(3) For Class I and Class II material the quantity shall be figured to the payline width for the pipe size required and shall be applied to the classification of material provided on the Form of Bid unit prices, and as classified herein:

(a) The payline volume shall be that of a prism with a width as noted below, a length of material encountered, and a depth from the bottom of pipe to the top of the classified material:

<table>
<thead>
<tr>
<th>Payline Width:</th>
<th>18&quot; width</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; and 8&quot; dia. pipe</td>
<td>28&quot;</td>
</tr>
<tr>
<td>10&quot; and 12&quot; dia. pipe</td>
<td>32&quot;</td>
</tr>
<tr>
<td>15&quot; dia. pipe</td>
<td>35&quot;</td>
</tr>
<tr>
<td>18&quot; &quot;</td>
<td>39&quot;</td>
</tr>
<tr>
<td>21&quot; &quot;</td>
<td>42&quot;</td>
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<tr>
<td>24&quot; &quot;</td>
<td>45&quot;</td>
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<tr>
<td>27&quot; &quot;</td>
<td>49&quot;</td>
</tr>
<tr>
<td>30&quot; &quot;</td>
<td>53&quot;</td>
</tr>
<tr>
<td>33&quot; &quot;</td>
<td></td>
</tr>
</tbody>
</table>
(4) For Class III and Class IV material, of existing satisfactory soil types, area shall be figured to the line twenty-four inches (24") outside the exterior face of each foundation wall, or to the outer edge of the footing projection, whichever is greater and to the face of piers.

(5) Depth of excavation shall be figured from existing grade to required subgrade for footings, grade beams, and slabs or base under slab.

1.4 COMPACTION TESTS AND INSPECTION

A. The Owner shall retain and incur the cost of a Geotechnical Engineer for the purpose of field inspection of sub-grade conditions.

B. This Contractor shall be responsible for notifying the General Contractor, Architect, and Geotechnical Engineer to arrange for inspection and/or testing prior to proceeding with any further related work as follows:

(1) Excavation to sub-grade elevation for footings, foundations, and sub-grade elevations for slabs.

(2) Compaction of fill/backfill as specified herein.

(3) Compaction of virgin material.

(4) Compaction of granular material and fill.

C. All areas requiring inspection and/or testing shall receive written certification and approval by the Geotechnical Engineer prior to proceeding with any further work.

D. The Contractor shall notify the Geotechnical Engineer a minimum of 24 hours in advance of commencing all work requiring inspection.

E. If excavated conditions differ from the soils test report information provided, or field conditions appear materially different, unusual, or appear unsatisfactory for sound bearing based on visual inspection workability, or equipment handling of soils, notify the Architect and Geotechnical Engineer immediately to obtain additional instructions regarding performance requirements and to determine costs based on unit prices or predetermined costs.

(1) If unsuitable bearing materials are encountered at the subgrade elevations, carry excavations deeper and replace excavated material as directed by the Geotechnical Engineer, and/or Architect.

(2) Removal of additional unsuitable material and its replacement as directed will be paid on basis of contract conditions specified herein or as mutually agreed to between the Contractor and Owner as approved by the Architect, relative to the changes in the work.

1.5 COMPACTION SPECIFICATION REQUIREMENTS

A. Particulars: Compaction densities shall apply to areas of engineered fill and cut/virgin areas.

<table>
<thead>
<tr>
<th>Area</th>
<th>Required Densities (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohesive Material (Satisfactory Soil)</td>
<td></td>
</tr>
<tr>
<td>Building areas (below footing subgrade)</td>
<td>95%</td>
</tr>
<tr>
<td>Building areas (above footing subgrade)</td>
<td>95%</td>
</tr>
<tr>
<td>Backfill adjacent to foundations</td>
<td>95%</td>
</tr>
</tbody>
</table>

* Required densities are expressed as a percentage of the maximum dry density determined in accordance with ASTM D 1557 laboratory test procedure (Modified Proctor).
B. Particulars

<table>
<thead>
<tr>
<th>Area</th>
<th>Required Fill Densities (%) **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Cohesive Material (Granular Material)</td>
<td></td>
</tr>
<tr>
<td>Building areas (below footing subgrade)</td>
<td>95%</td>
</tr>
<tr>
<td>Building areas (above footing subgrade)</td>
<td>95%</td>
</tr>
</tbody>
</table>

** Required fill densities are expressed as a percentage of the maximum dry density determined in accordance with ASTM D1557 laboratory test procedure (Modified Proctor)

C. Fill shall be placed in uniform lifts (loose thickness not exceeding eight inches (8")) and systematically compacted until the required density is achieved. The soil should be placed at a moisture content compatible with the required density. Deleterious material such as organics, construction debris, or frozen soil should not be placed on soft material or frozen ground.

1.6 PROTECTION

A. Existing facilities, trees, and utilities that remain in place, or are to be relocated, which are indicated on the drawings or the locations of which are made known to the Contractor prior to excavating work, shall be protected from damage during this work. If damage occurs, it shall be repaired or replaced at the Contractor's expense. (See Section 01000 for protection procedures.)

B. Protect footing trench prior to the placement of concrete from deterioration of virgin bearing surface due to saturation from storm water run-off and other forms of construction site water.

C. The Contractor is required under federal regulations to contact the appropriate local gas company prior to any and all excavation activities to ascertain and request the field location of specific utility lines two (2) days prior to starting work (not counting weekends or holidays), by the local utilities company.

(1) This requirement exists regardless of utility lines shown on the drawings.

D. This Contractor is required and solely responsible per Missouri Statute RSMO Chapter 319, setting forth the responsibilities of the Contractor regarding all pre-excavation activities, to contact all local utility companies and/or Dig-Rite to locate all utilities.

E. All utilities shown on the drawings are approximate only, and have been established by available data provided by the Owner. The accuracy is not guaranteed. The Contractor shall make all necessary efforts to contact all local utility companies and request utility companies to field locate lines prior to starting any work.

(1) Any damage resulting from the Contractor's activities on utility lines which have been field located by the utility companies as required herein shall be repaired by the Contractor at no additional cost to the Owner.

(2) Any damage resulting from the Contractor's activities on utility lines which are not field located by the utilities companies or not shown on the drawings or unknown prior to any excavation activity shall be repaired, and the cost of such repair work shall be considered additional work, and adjustment of the contract price will be made.

(3) The Contractor shall also review with the Owner's designated field representative prior to any excavation activity, the total site area where work is to occur, and endeavor to obtain any additional information regarding all buried utility lines shown on the drawings or otherwise known by the Owner, but not shown on the drawings.

F. All utilities that are to be retained, but are not located on the drawings or otherwise known to the Contractor in sufficient time to prevent damage, if inadvertently damaged during this work, shall be repaired or replaced by the Contractor and adjustment of contract price will be made.
G. Care shall be taken in placing fill to prevent damage to mechanical work which may be in place; box around pipes and conduit as required for protection; distribute fill material with hand carts or wheelbarrows where trucks could damage pipes.

H. Repair of all damage resulting from this work to existing site, building, pavements of all types, vegetation, and landscaping except as noted previously, shall be the responsibility of the Contractor, and shall be repaired or replaced to the satisfaction of the Architect without limitation, at no additional cost to the Owner.

I. Shoring, sheeting, and bracing shall be provided as required to prevent caving, erosion, or gullying of sides of excavation.

J. Protection of Persons and Property: Contractor shall be responsible for job site safety per all applicable codes and regulations.
   
   (1) Barricade and/or cover all open excavations, post warning signs, warning lights as necessary, on a daily basis.
   (2) Erect temporary fencing around perimeter of excavated ditches, trenches, etc.

K. Use of Explosives: **The use of explosives is not permitted.**

2. PRODUCTS

2.1 MATERIALS

A. Granular Fill: Provide one inch (1"), one and a half inches (1½"), or two inches (2"), minus crushed limestone. Thickness as shown on the drawings.

B. Clean Rock: Clean rock shall not be used as trench backfill or any other backfill due the risk of water ponding in the subgrade, and activating the highly plastic clays.

3. EXECUTION

3.1 GENERAL

A. Storing of earth for use in backfilling shall be done in such a manner as to not interfere with the work of other trades.

B. Type of mechanical equipment to be used within 10'-0" of foundation walls shall be of such size and type as to not endanger work in place.

C. The adequacy of all bearing surfaces shall be subject to review by the Architect or Engineer upon notification by the Contractor.

D. Operations on earth work shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing weather, or other unsatisfactory conditions.

E. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

F. Stability of Excavations: Slope sides of excavations to comply with all applicable local codes, ordinances and OSHA standards. Provide, install, and remove shoring, bracing, and piling where slope excavations are not possible because of space restrictions or stability of material excavated, as required.

G. Material Storage: Stockpile satisfactory excavated materials until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
   
   (1) Locate and retain soil materials away from the edge of excavations.
   (2) Unusable unsatisfactory soil types excavated shall be hauled and disposed of by this Contractor.

H. Compaction: Perform all placement and compaction of engineered fill as required to complete the work. Compact existing cut and/or virgin soil as necessary to obtain the specified compaction densities. **No water jetting will be allowed.**
3.2 SHORING AND BRACING

A. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross-braces, in good serviceable condition.
B. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
C. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
D. All shoring and bracing work shall be done at no additional cost to the Owner.

3.3 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Utilize perimeter trenches/swales or other means as necessary.
B. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, sumps, suction, and discharge lines, and other dewatering system components necessary to convey water away from excavations.
C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
D. All dewatering work shall be provided as part of the total excavation work of this contract, at no additional cost to the Owner.

3.4 EXISTING STRUCTURES

A. Remove portions of sidewalks, driveways, paving and curbs as noted and remove debris from the site. Remove walks and curbs in whole sections to the nearest joint.
B. Remove foundation walls, footings, and slab remaining from demolition operations to a point not less than twelve inches (12") below rough grade elevations. Remove all debris from the site.
C. This work shall be provided as required as part of this contract where required to complete work of the entire project and/or as noted. Any foundations, footings, slabs, etc., buried on site and unknown shall be removed as directed by the Architect or Engineer, and the contract sum adjusted accordingly.

3.5 EXCAVATING

A. Excavations shall be kept free of water at all times by pumping, bailing, or laying of temporary drain lines. Excavation and fill shall be kept free of pockets and depressions which will prevent drainage. Water shall not be permitted to enter building through any means.
B. Banks shall be braced and all excavations shall be kept free of slides and surplus soil. Bracing shall be adequate and safe for conditions encountered and thoroughly heeled.
C. All excavations shall be made to lines and grades as indicated on the drawings and as required to permit completion of structure as detailed.
D. Rough excavation shall be carried to a depth of four inches (4"), below slabs on grade to receive granular fill material; increase depth if required by detail or by existing site conditions. Under no circumstances shall depth to sub-grade below slabs be less than four inches (4") for installation of granular fill.
E. Footing trenches and column pads shall be exact depths and dimensions with plumb banks and square cut corners.
F. Exercise care to prevent bearing soil from freezing, or ponding water.
G. Dewater all footing areas completely prior to placing concrete.
H. Over-excavated areas at footings shall be brought to correct depth by one of the following means as directed by the Architect or Engineer:

(1) Granular fill compacted to correct density.
(2) Concrete.
(3) Satisfactory soil types compacted to correct density, at engineered fill and virgin soil areas.

I. Over-excavated areas at slab-on-grade shall be brought to correct depth as follows, unless directed otherwise by the Architect or Engineer:

(1) Granular fill compacted to correct density.

J. All areas over-excavated by the Contractor shall be brought to correct depth as required, at no additional cost to the Owner.

K. All footing trenches shall be excavated to additional depth, if required to obtain secure, firm bearing. The Contractor shall notify the Architect or Engineer of such non-conforming conditions and request instructions from Architect or Engineer regarding additional excavation depth and instructions regarding compacted fill, or other means as necessary to bring elevation up to correct level. Costs associated with this work shall be adjusted per unit costs or predetermined costs as applicable.

3.6 COMPACTION

A. General: Control soil compaction during construction providing minimum percentage of density specified for each classification indicated below. No water jetting will be allowed.

B. Structures and Building Slabs:

(1) Fill areas that require engineered fill (refer to site and building plans) and/or areas requiring soil treatment;

(a) Place fill material in lifts not exceeding eight inches (8") for heavy equipment compaction; four inches (4") for hand compaction.

(b) Compact each lift to 95% of the maximum dry density determined by Modified Proctor ASTM D-1557 (tests shall be performed at each lift or as determined by Geotechnical Engineer).

(2) Filling over-excavated areas:

(a) Over-excavated areas or sub-grade soils disturbed by nature or construction activities shall be brought to the correct elevations using:

1) Engineered fill of satisfactory soil types, compacted to required density per structures and building slab.
2) Granular fill, compacted to required density per structures and building slab.
3) Concrete or lean concrete or flowable fill.
4) Review with Architect or Geotechnical Engineer prior to commencing work for verification, inspection, and approval.

(3) Granular fill under interior slabs-on-grade:

(a) Course consists of placement of granular fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

(b) Place granular fill material on prepared subgrade in layers of uniform thickness, conforming to four inch (4"), minimum thickness or as otherwise noted or required by site conditions. Maintain optimum moisture content for compacting material during placement operations. Refer to 1.6, B, for the required densities for granular fill below interior floor slabs.
C. Field Quality Control:

(1) Quality Control Testing During Construction: Notify the Geotechnical Engineer prior to starting work to allow testing services inspection for approval of subgrades and fill layers before further construction work is performed.

3.7 BACKFILL AND FILL

A. Backfill excavations as promptly as work permits, but not until completion of the following:

(1) Acceptance of construction below finish grade including, where applicable:

   (a) Waterproofing.
   (b) Perimeter insulation.
   (c) Filter fabric.
   (d) Inspection or testing as specified.

B. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 2 horizontal so that fill material will bond with existing surface.

C. Placement and Compaction: Place backfill and fill materials in layers not more than eight inches (8") in loose depth for material compacted by heavy compaction equipment, and not more than four inches (4") in loose depth for material compacted by hand-operated tampers. No water jetting will be allowed.

D. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

E. When existing ground surface virgin soil has a density less than specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

END OF SECTION 02200
1. GENERAL

1.1 SCOPE

A. Furnish all labor, material, equipment and services necessary to perform the concrete portions of the construction indicated on the drawings and specified herein.

B. Related work specified elsewhere:

   (1) Section 01035 - Alteration Work Procedures.
   (2) Section 02050 - Demolition.
   (3) Section 02200 - Excavating, Etc.
   (4) Section 05000 - Miscellaneous Metal.
   (5) Section 06100 - Carpentry.
   (6) Section 07900 - Caulking and Sealants.
   (7) Section 09250 - Gypsum Wallboard (Drywall).
   (8) Section 09900 - Painting and Finishing.
   (9) Division 15 - Mechanical.
   (10) Division 16 - Electrical.

1.2 UNIT PRICES

A. Unit prices shall be submitted covering possible changes in the scope of concrete work. Unit prices shall be submitted for each of the categories indicated on the "Form of Bid".

1.3 SHOP DRAWINGS

A. Submit in accordance with the Supplementary Conditions.

B. Reinforcing steel placing drawings shall conform to the American Concrete Institute's "Manual of Standard Practice" indicating reinforcing details, schedules and setting diagrams.

1.4 QUALITY ASSURANCE

A. All work shall comply with the following codes, specifications and standards, except where more stringent requirements are shown or specified herein:

   (1) ACI 301, "Specification for Structural Concrete for Buildings".
   (2) ACI 318, "Building Code Requirements for Reinforced Concrete".
   (3) ACI 347, "Recommended Practice for Concrete Formwork".
   (4) ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
   (5) ACI 302, "Guide for Concrete Floor and Slab Construction".
   (6) Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

1.5 REFERENCES

A. American Society for Testing and Materials (ASTM)

   (1) ASTM E-1745-97 Standard Specification for Plastic Water Vapor Retarders used in contact the soil or granular fill under concrete slabs.
   (2) ASTM E-154-88 Standard Test Methods for Water Vapor Retarders used in contact with earth under concrete slabs.
   (4) ASTM E1643-98 Standard Practice for Installation of Water Vapor Retarders used in contact with earth or granular fill under concrete slabs.
B. American Concrete Institute (ACI)

   (1) ACI 302.1R-96 vapor barrier component (plastic membrane) is not less than 10 mils thick.

2. PRODUCTS

2.1 MATERIALS

A. Ready-Mixed Concrete: All concrete shall be ready-mixed concrete, conforming to ASTM Specification C-94.

B. Cement and Admix:

   (1) Cement: Portland cement conforming to ASTM C-150 of type suitable for concrete noted.
   (2) Air-Entrained Admix: Air-entrained admix conforming to ASTM C-260 may be used in lieu of Type 1A cement, where air-entrained concrete is specified.
   (3) Water Reducing Admix: Manufacturer’s recommendations must be followed and control tests conducted to provide strength and slump required. Use of admixture shall not reduce quantity of cement per cubic yard of concrete of established mix.

C. Aggregates: Conform to ASTM C-33 concrete aggregates.

   (1) Coarse aggregate: Contain a maximum of 1% chert or quartz, graded as specified.
   (2) Fine aggregate shall be limited to natural sand containing a maximum of 1/4% to 1% Lignite. For exposed aggregate work, no Lignite is permitted.

D. Water: Fresh, potable, clean, free of oil, acids, salts, organic matter or other deleterious matter.

E. Metal Reinforcement:

   (1) Bars: Intermediate grade new billet steel conforming to ASTM Specification A-615; Grade 60. Deformed and plain billet-steel bars for concrete reinforcement. Dowels from concrete walls that are to be field bent into position shown are required to be grade 40. All reinforcing bars shall be deformed and free from harmful rust and dirt.

F. Accessories and Concrete Treatments:

   (1) Vapor Barrier:

      (a) Vapor barriers must have the following qualities:

         1) WVTR equal to or greater than industry standard of ASTM E-96.
         2) ASTM E-1745 Class A (plastic).

      (b) Vapor barrier products:

         1) Stego Industries: Stego Wrap (15 mil).
         2) W.R. Meadows: Perminator (15 mil).
         3) Raven Industries: Vapor Block (15 mil).
         4) Reef Industries: Griffolyn (15 mil).

      (c) Provide pressure sensitive tape for sealing joints and penetrations as required by the manufacturer.
(2) Premoulded Expansion Material: Celotex Corp. "Flexcell"; Sealtite, or other comparable asphalt impregnated cane fiber compressible filler, thickness as required. For expansion joint filler below grade, and where "sealant" is noted, use a foamed plastic, non-asphaltic of proper thickness for joint involved.

(3) Waterproof paper: Sisalkraft or other comparable reinforced waterproof kraft paper conforming to Federal Specification UU-P-264a.


(6) Form coating: Non-staining form oil conforming to Federal Specification P-O-361 or specially prepared sealer coating comparable to Shell Form Compound "C", A.C. Horn "Formfilm", or Toch Bros. "RIW Form Coating".

(7) Accessories: All metal accessories coming in contact with form work for exposed concrete (either interior or exterior) shall be steel with plastic tipped legs, hot dipped galvanized or stainless steel with upturned legs.

(8) Cone Hole Plugs: Burke "Snaplug" of size detailed.

(9) Bonding Agent: Comparable to Upco 705 bonding adhesive.

(10) Non-shrink Grout: Comparable to Embeco Grout (pre-mixed).

G. Forms: Construct all forms for concrete work of wood, metal or other materials conforming to the following requirements, and of the grade and type suitable for obtaining the type of finish specified.

(1) Wood forms shall be moisture resistant APA-BB-Plyform exterior concrete form grade plywood, not less than 5-ply and at least ¾" thick. Metal forms may be used if straight, strong and capable of producing a similar or superior surface to wood forms.

(2) Use milled wood strips for chamfers and offsets.

(3) Previously used form materials may be used in lieu of new materials, providing that contact surfaces, edges and jointing of used materials are sufficiently smooth, clean and free from warp to produce concrete surfaces equal to smooth new form materials.

(4) Form ties shall be removable or snap-off. Removable ties shall be coated with lacquer or other similar material to facilitate removal, pulled from inside face. Wire ties will not be permitted.

H. Storage of Materials: Cement and aggregate shall be stored so as to prevent deterioration or intrusion of foreign matter. No deteriorated or damaged material shall be used for concrete.

2.2 PROPORTIONS AND MIXES

A. Concrete shall be mixed with the following material characteristics:

(1) For all concrete work except as noted herein:

   Type 1 Portland Cement
   4000 psi strength, minimum at 28 days
   6 sack, minimum cement content
   Maximum water-cementitious materials ratio: 0.45
   Coarse aggregate, ASTM size 57, graded from 1” to #4
   Water Reducing Admix
   High Range Water Reducer or Plasticizing Admix
   Slump, Limit 4” (plus or minus 1 inch), before adding high-range water-reducing admixture or plasticizing admixture.
   Air Content: Maintain within range permitted by ACI 301.
(a) For trowel finished floor slabs, do not allow air content to exceed three percent (3%).
(b) For foundations and footings, air content must be six percent 6% (± 1½%).

Note: Type III, high early strength cement, may be used without additional cost upon approval of the Architect and Engineer

B. As soon as possible after selection of the concrete supplier, the Contractor's representatives, including job superintendent, shall meet with testing laboratory representative and concrete suppliers' representative to make such trial batches as are necessary to establish proportions of cement, water, fine and coarse aggregate to achieve specified minimum strength at 28 days.

(1) Trial batches shall be tested per Par. 2.3, C, 1.
(2) When a completely satisfactory mix is established, it shall be maintained without change, except by written order of the Architect.

2.3 CONCRETE TESTING

A. The use of previous design mixes from past projects may be considered for use on this project, at the discretion of the Architect and Engineer.
B. All laboratory work shall be done only by a testing laboratory acceptable to the Architect and all costs of testing shall be addressed by the Owner.
C. Test procedures shall conform to the following ASTM Specifications:

(1) C-143 Slump Test
(2) C-31 Making and curing of field cylinders
(3) C-192 Making and curing of laboratory cylinders
(4) C-39 Cylinder Test
(5) C-231 Testing air content of fresh concrete by pressure method
(6) C-172-71 Sampling fresh concrete

D. The following tests are required:

(1) All tests required to establish mix proportions shall be made including not less than four cylinder tests of each of three separate slumps (2", 3½", and 5").
(2) Slump: One test for each set of test cylinders and one test for each load at point of discharge.
(3) Compressive Strength: Two sets of three cylinders for each 50 cu. yds. or each days pour. One set tested at 7 days, the other set tested at 28 days. Cure one 7-day and one 28-day cylinder under job conditions (ASTM C-31-Par. 7.4).

E. In-Place Test: Where questions exist as to quality of concrete placed, the Architect may require tests per ASTM C-42 or order load tests per Chapter 20 of ACI Building Code Requirements for Reinforced Concrete ACI 318-77. If tests confirm deficiency, the Architect reserves the right to require the demolition and replacement of the affected work at no extra cost to the Owner.
F. Test results shall be used as a basis for the adjustments in the concrete mix or water content as directed by the Architect.
G. The Contractor shall be responsible for delivery of test cylinders to the laboratory.

3. EXECUTION

3.1 PREPARATION

A. Formwork

(1) Forms shall conform to shapes, lines, dimensions, and provide slots, keyways, openings as required and indicated on the drawings.
(2) Build forms substantial and able to withstand all loads to which they may be subjected, sufficiently tight to prevent leakage of mortar, and securely braced or tied together so as to maintain position and shape, and produce a smooth concrete finish. Tape joints to prevent leakage where exposed.

(3) Provide cleanout openings in base of wall forms where required to facilitate cleaning.

(4) Top of concrete shall be level except where otherwise indicated on the drawings.

(5) Provide wood stops or box forms to provide recesses and openings as required.

(6) Set pipe sleeves for mechanical and electrical work in formwork as required. Proper location shall be the responsibility of the several trades involved.

(7) Set miscellaneous steel angles, bolts and inserts for bolts and anchors.

(8) Chamfer all exposed corners of piers, columns, and beams, ¾” x ¾”, unless otherwise detailed. Plastic corner inserts may be used.

B. Fabrication and Placing of Reinforcing Steel

(1) Except as otherwise specifically noted, all reinforcing steel shall be fabricated and placed in accordance with the applicable provisions of The American Concrete Institute "Manual of Standard Practice for Detailing Reinforced Concrete Structures" (ACI315) and the Concrete Reinforcing Institute "Specifications and Recommended Practice for Placing Reinforcing Steel", latest edition.

(2) Carefully form reinforcing steel to sizes and shapes required. Heating and rebending of bars will not be permitted.

(3) Reinforcement and accessories shall be free of rust, scale, mud, ice, or other harmful films in quantities that will adversely affect the quality of the concrete.

(4) Formwork shall be coated with form coating prior to setting of reinforcing steel.

(5) Accurately locate and securely tie all metal reinforcement and accessories in formwork. Tie metal reinforcement at intersections with 16-gauge annealed wire. Support bars on metal supports and chairs. Bars shall not rest against formwork or earth.

(6) Dowels shall be in position before placing concrete. Pushing bars into freshly placed concrete is not acceptable.

(7) Welded wire fabric shall lap six inches (6") at sides and six inches (6") at ends and be wired together. Welded wire fabric is required in all flat slab work.

C. Preparation for Placing Concrete

(1) Notify all other trades and the Architect sufficiently in advance of the scheduled time for concrete placement to permit installation of all parts of the work and for review of forms and reinforcement.

(2) Before placing concrete, forms shall be true to shape and alignment and cleaned of all chips, sticks, sawdust, earth, laitance, and other foreign matter. Remove hardened concrete, debris and foreign materials from form interior and from mixing and conveying equipment inner surfaces.

(3) Remove water from excavations before depositing concrete. Divert all water flow through proper side drains. Remove without washing over freshly deposited concrete.

(4) Unless previously oiled, forms shall be wetted, except in freezing weather. Adjacent masonry surfaces shall be well drenched with water.

(5) Provide runways or other means for wheeled equipment to convey concrete to deposit points. Do not wheel equipment or support runways on reinforcement.

(6) Place screeds as required to maintain specified thickness of all slabs.

(7) Before placing concrete, all required embedded items shall be installed.

(8) Before new concrete is deposited on or against concrete that has set, the formwork shall be retightened, the surface of the set concrete shall be roughened, cleaned of foreign matter and laitance and thoroughly wetted. Flush the cleaned and wetted surfaces with a coating of neat cement grout or bonding agent against which the new concrete shall be placed.
(9) Preparation of rough grade and granular fill for grade supported slabs is not a part of this work, but surface shall be checked for proper grade; tamp off and level as required.

(10) Immediately prior to placing concrete, all dowels shall have rust, scale and mud removed.

(11) Vapor barrier shall be provided for all interior grade supported slabs. Edges shall be lapped a minimum of six inches (6") and sealed with Grade 495 pressure sensitive tape. Material shall be laid in the maximum practicable widths in order to minimize laps. As concrete is placed, patch vapor barrier where damaged.

(12) All testing of pipes in concrete shall be completed prior to placing concrete.

(13) Before concrete is deposited on new or existing concrete, surface shall be prepared and treated with bonding agent per manufacturer's directions.

3.2 PLACING CONCRETE

A. Mixing and Delivery

(1) Ready-mixed concrete shall be mixed and delivered in accordance with ASTM Specifications C-94 for "Central-Mixed" or "Truck-Mixed" concrete only.

(2) Irrespective of amount of prior rotation, operate mixer at mixing speed for one full minute immediately prior to unloading.

(3) Concrete shall be placed within 60 minutes after water and cement are combined.

(4) Overloading of trucks beyond rated capacity, operation with clogged drums and addition of water after initial mixing will not be permitted.

(5) All ready-mixed delivery tickets shall be received by job foreman, who shall keep them in good condition and turn them over to the Architect on request.

B. Hot Weather Requirements: Conform to ACI Standard 305 and the following:

(1) Use water reducing and retarding admixture only after review by the Architect, unless otherwise specified.

(2) Maximum temperature of concrete when arriving at the job site shall not exceed 80° F.

(3) Thoroughly wet forms prior to placing concrete.

(4) See paragraph on "Curing and Protection" for hot weather curing.

C. Conveying and Placing - Comply with ACI 304 and as specified herein:

(1) Convey concrete from mixer to forms as rapidly as possible, without segregation or loss of ingredients, and deposit in forms as nearly as practicable in final position.

(2) Immediately after placing, compact concrete by agitating thoroughly to force out air pockets, work mixture into corners, around reinforcement and inserts to prevent formation of voids. Tapping or other external vibration of forms will not be permitted. Exercise care in use of vibrators to prevent segregation, sand pockets, or bleeding. Move vibrator continuously in and out of concrete, keeping stationary only a few seconds in any position; have a spare vibrator on the site for emergency use.

(3) Concrete shall not be permitted to drop freely over sixty inches (60") in unexposed work or over thirty-six inches (36") in exposed. Chutes, if used, must slope sufficiently to insure flow of properly proportioned concrete and must be kept free of hardened or partially set concrete.

(4) Concrete shall be placed in horizontal layers not over twelve inches (12") thick in walls and grade beams.

(5) Wall bearing concrete shall bear on walls as detailed but not less than four inches (4"), unless otherwise specifically detailed less than four inches (4").
D. Footings

(1) Size and depth shall be as shown on the drawings, unless additional depth is required for adequate bearing, on a unit price basis.

(2) Concrete shall be placed on damp, hard, undisturbed earth, free from water, loose soil and debris.

(3) Concrete shall not be placed until location, forms and bearing surfaces have been reviewed by the Architect.

(4) All holes, cuts, depressions or trenches, under or adjacent to, footings and underpinning, before and after placing, shall be filled solid with concrete.

3.3 FINISHING

A. Removal of Forms and Finishing of Standing Surfaces

(1) Remove forms and shoring only after concrete has attained sufficient strength to support all construction loads which may be applied. The results of the control tests may be used as evidence that concrete has attained the required strength. Do not overload green concrete.

(2) Forms and ties shall be carefully removed to prevent spalling concrete surfaces. Break off one inch (1") or more back from concrete surfaces, remove cones, point holes full, and tool flush with surface. Projections, wires, etc., shall be cut off below surface and neatly pointed.

(3) Exposed interior concrete surfaces shall have a burlap rubbed finish while still green.

(4) All honeycombed concrete shall be cut back and filled with mortar rammed in solid and struck flush. Add white cement to mortar to facilitate matching. All exposed concrete surfaces shall be finished by removal of projections and filling of voids.

(5) Exposed top of walls shall have free edges tooled and flat area troweled smooth.

B. Finishing of Interior Floor Slabs

(1) Float Finish

(a) Apply float finish to monolithic slab surface to receive trowel finish and other finishes as herein specified.

(b) After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power driven floats, or both consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish “slabs on grade” surfaces to tolerances of F(F) 35 (floor flatness) and F(L) 25 (floor levelness), with minimum local values of flatness F(F) 24 and of levelness F(L) 17 measured according to ASTM E-1155. Finish “suspended slabs” surfaces to tolerances of F(F) 30 (floor flatness) and F(L) 20 (floor levelness), with minimum local values of flatness F(F) 24 and of levelness F(L) 15 measured according to ASTM E-1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drain. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Gym Floor: Finish “slab on grade” surface to tolerances of F(F) 40 (floor flatness) and F(L) 35 (floor levelness), with minimum local values of flatness F(F) 30 and of levelness F(L) 24 measured according to ASTM E-1155.

(c) Where necessary to add materials to obtain proper thickness, apply a thin topping of 1 part cement, 1½ parts sand, and 1½ parts ¾” aggregate and tamp well into the slab before screeding. In no event shall the surface be dusted with dry cement or cement-sand mixture.
(2) Trowel Finish

(a) Apply trowel finish to monolithic slab surfaces to be exposed to view, and slab surfaces to be covered by resilient flooring, carpet, ceramic tile or quarry tile.

(b) After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over the surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 40 (floor flatness) and F(L) 40 (floor levelness) measured according to ASTM E-1155. Grind smooth surface defects which would telegraph through the applied finish flooring.

(3) Trowel and Fine Broom Finish

(a) Where ceramic tile or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying the surface by fine brooming.

(4) Upon completion, floor surfaces shall not vary more than ⅛" in 10'-0" from level, except that where so designated, surface shall be accurately and uniformly sloped to drain. Floors shall be sloped ¼" per foot around floor drains in a four foot (4') diameter circle, unless otherwise indicated on the drawings.

(5) All surfaces shall be left ready to receive finish flooring materials.

C. Expansion Joints

(1) Expansion joints shall be provided where indicated on the drawings.

(2) Expansion joints shall be formed with ½", or width as detailed otherwise, preformed expansion joint filler, with the top ¾" of joint filled with Tremco "Dymeric" caulking.

(3) Joints shall be reinforced with ½" diameter smooth round bar dowels, sixteen inches (16") long and spaced twelve inches (12") on center. One end of dowel shall be greased or set in dowel socket to prevent bond. Reinforcing or other embedded metal items bonded to the concrete (except dowels in floors bonded only on one side of the joint) shall not be permitted to extend continuously through any expansion joint.

D. Construction Joints

(1) Construction joints shall be located so as to least impair the strength and appearance of the finished structure and shall be subject to review by the Architect and/or Engineer. Joints shall occur at points of minimum shear.

(2) All vertical construction joints shall be provided with water-stops extending from top of footings or bottom of grade beam to top of wall. Splices shall be made waterproof per direction of the manufacturer. Steel or dowels shall extend through joints so as to provide 40 diameter minimum lap. Construction joints in flat slabs shall be keyed, except where bulb-type waterstop is indicated.

(3) Construction joints in slab shall have premoulded T & G form.

(4) Seal joints as noted for contraction joints.

(5) If "construction joints" are incorporated in slabs that receive no finish floor material, and "contraction joints" are indicated on the plan, the "construction joint" shall coincide with the "contraction joint" layout.

E. Contraction Joints (Control Joints)

(1) Contraction joints shall be provided in interior slabs on grade as indicated.

(2) Joints shall be located as indicated on the drawings or as reviewed with the Architect and/or Engineer.
(3) Contraction joints shall be cut with a power saw, cutting a minimum of ¼ of the depth of the slab, and then cleaned thoroughly of dust and filled with Tremco Dymeric caulking flush with the surface of slab. Where it is not possible to saw joints, form joint with short length of ¼" x 1" fiber strip, then remove strip and fill joint.

F. Isolation Joints

(1) Locate around columns and perimeter of slab.
(2) Form with waterstop as specified.
(3) Place ½” expansion material around joint to within ½” of surface of slab. Fill void with Tremco Dymeric caulking flush with surface of slab.

G. Curing

(1) Concrete shall be prevented from premature drying for minimum of seven days after placing. Keep exposed surfaces of concrete moist for 24 hours after placing.
(2) When temperature of surrounding air is above 95° F, concrete shall be dampened at intervals of not more than 2 hours for the first 48 hours and 4 hours for the next 48 hours.
(3) When temperature of surrounding air is below 40° F, concrete shall be maintained at a temperature of not less than 50° F, for at least 5 days or 70° F for 3 days. High early strength Portland Cement concrete shall be maintained at a minimum of 65° F for 24 hours, or longer if necessary.
(4) Sprayed-on curing compounds, if used, shall be applied in accordance with, and within time limits of, the manufacturer’s recommendations. **NOTE:** Sprayed-on curing compounds shall not be used where hardener is to be used, or where additional concrete or other material is to be bonded.

H. Protection

(1) Cover interior and exterior concrete finishes with waterproof paper after finishing and maintain in good condition until removed. Joints in paper shall be secured with paper tape. Do not leave slabs unprotected the first night after placing.
(2) Covering shall be of type that will not stain or discolor finished concrete surfaces.
(3) Protect adjacent materials during concrete work.

I. Patchwork: All patchwork of horizontal and vertical surfaces shall be a part of the work of this Section.

(1) Old surfaces shall be clean and a bonding agent used.
(2) Finish surfaces shall be flush with adjacent surfaces and shall match existing surfaces.

END OF SECTION 03100
1. General

1.1 Scope

A. This work includes all labor, materials, accessories, scaffolding, and equipment required to complete the interior and exterior masonry work described on the drawings and specifications.

B. Related work specified elsewhere:

1. Section 01000 - General Provisions.
2. Section 01035 - Alteration Work Procedures.
3. Section 02050 - Demolition.
4. Section 03100 - Concrete and Cement Work.
5. Section 05000 - Miscellaneous Metal.
6. Section 05100 - Structural Steel.
7. Section 06100 - Carpentry.
8. Section 07210 - Building Insulation.
9. Section 07600 - Sheet Metal.
10. Section 07900 - Caulking and Sealants.
11. Section 08100 - Metal Frames and Doors.
12. Section 08331 - Overhead Rolling Doors.
13. Section 08400 - Aluminum Entrance Work.
14. Section 08500 - Metal Windows.
15. Section 09250 - Gypsum Wallboard (Drywall).
16. Section 09900 - Painting and Finishing.
17. Section 10155 - Toilet Partitions.
18. Section 10500 - Lockers.
20. Section 10800 - Washroom Accessories.
21. Section 12300 - Casework (Ready-Made).
22. Division 15 - Mechanical.
23. Division 16 - Electrical.

1.2 Quality Control

A. Protection and Storage

1. All materials shall be delivered in an undamaged and usable condition and shall be stored off the ground and protected from rain, snow, or standing water.

2. **The top of all walls shall be covered at all times when work is not in progress. The covers shall hang down a minimum of 2'-0" on each side of the wall and shall be secured to prevent uplift, flapping or displacement due to wind.**

3. All materials not properly stored, and all walls not properly protected, shall be immediately removed from the site if, in the judgment of the Architect, the material or wall is damaged.

4. All chipped, cracked, stained, frozen, or otherwise damaged or rejected materials shall be promptly removed from the job site.

B. Environmental Conditions

1. Masonry work shall not be done when the temperature is below 36° F and falling. Work may be done if the temperature is at least 28° F and rising.

2. All masonry work shall be maintained above 32° F for not less than 48 hours after initial construction. The General Contractor shall provide temporary heat and temporary enclosures as required to maintain these minimum temperature conditions.
C. Workmanship

(1) These specifications call for the highest quality masonry work.
(2) Only highly skilled and experienced craftsmen shall be employed to execute this work.
(3) The limitation and quantity of chipped brick shall be for Type FBS, allowing only 10% or less.

D. Coated Masonry

(1) Coated brick or coated concrete masonry will not be accepted as a masonry product.

1.3 REFERENCE STANDARDS

A. The following published reference standards shall be incorporated into this specification.

(1) American Society for Testing and Materials; standard specifications (latest editions) noted throughout this specification.
(3) TMS 402-08/ACI 530-08/ASCE 5-08, “Building Code Requirements for Masonry Structures”, as reported by the Masonry Standards Joint Committee (MSJC).
(4) TMS 602-08/ACI 530.1-08/ASCE 6-08, “Specification for Masonry Structures”, as reported by the Masonry Standards Joint Committee (MSJC).

1.4 SUBMITTALS

A. Submit manufacturer's product information and test data for all products specified for use on this project.
B. Provide design mix and test results for mortar and grout mixes specified. Include description of type and proportions of ingredients.
C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with one of the allowable methods in Section 2.2.

1.5 SPECIAL INSPECTIONS AND TESTING

A. The Owner will retain, and incur the cost, of providing special inspections and testing.
B. The Contractor shall be required to coordinate his work with the testing agency employed by the Owner.

1.6 MASONRY VENEER TESTING

A. This Contractor shall include in its bid the costs to perform the following masonry test method:

(1) ATSM C1715-09, Standard Test Method for evaluation of water leakage performance of masonry wall drainage systems.

2. PRODUCTS

2.1 UNIT MASONRY

A. Face Brick

(1) Allow $750.00, (Seven Hundred Fifty Dollars), per thousand brick delivered and unloaded at the site. The price agreed to at the time of brick selection shall prevail without change throughout the contract period. The contract sum shall be revised by Change Order to compensate for the difference between the specified allowance and the agreed to price.
The quantity of brick will be determined by dray tickets and invoices from the brick supplier.

(1) Brick shall conform to ASTM C-216, "Standard Specification for Facing Brick (Solid Masonry Units made from Clay or Shale)".
(2) Face brick shall be grade "SW" and Type FBS.
(3) Provide uncored and unfrogged brick where coring or frogging would otherwise be exposed.
(4) Face brick shall be modular size with 3 bricks and ¾" joints equaling 4" x 8" x 8".

2.2 CONCRETE MASONRY

A. Concrete Brick

(1) Brick shall conform to ASTM C-55, "Standard Specification for Concrete Building Brick".
(2) All brick shall be Type 1, moisture controlled, and Grade "N".

B. Hollow Load-Bearing/Non-Load Bearing Units

(1) Units shall conform to ASTM C-90, "Standard Specification for Hollow, Load-Bearing Concrete Masonry Units".
(2) Provide unit masonry that develops indicated net-area compressive strengths (f'm) at 28 days.
(3) Determine net-area compressive strength (f'm) of masonry by either of the following methods:
   a) From average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE6/TMS 602.
   b) By testing masonry prisms according to ASTM C-1314.
(4) Weight Classification: Lightweight.
(5) All units shall be Type 1, moisture controlled, and Grade "N".
(6) Exposed blocks shall be modular 8" x 16" face size, except as noted or required. Width of unit shall be manufactured to dimensions ⅜" less than nominal dimensions.
(7) Provide all lintel blocks, corner blocks, half blocks, jamb blocks, bullnose blocks, or other shapes noted or required by job conditions.
(8) All exterior corners of interior unit masonry walls shall be 1" radius corners. Where finished ceilings are installed, the radius shall continue to above the ceiling line. At exposed structures, the radius shall continue to the deck.

2.3 ACCESSORIES

A. Reinforcing Bars

(1) Shall conform to ASTM A-615, "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement", Grade 60, deformed.
(2) Reinforcing steel to be welded shall be ASTM A 706, "Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement", deformed.
(3) Welding of reinforcing bars to structural steel shall be performed by this Contractor. All welding shall be in accordance with the drawings and as specified in Division 5.

B. Joint Reinforcing

(2) Width shall be 2" less than nominal wall thickness.
(3) Provide all special corner and partition intersection shapes where shown or required.
(4) Approved Manufacturers:
(a) Hohmann and Barnard, Inc.
(b) AA Wire Products Company.
(c) TY-WAL, Jim Taylor, Inc.
(d) Heckman Building Products.
(e) Masonry Reinforcing Corporation of America.

(5) Solid Masonry Wall
(a) Reinforcing shall be truss or ladder type with 9 gauge side and cross wires.
(b) Provide appropriate size for single wythe uses.
(c) Provide at 16” o.c. horizontally or as indicated on the drawings.

(6) Cavity Masonry Wall (cavity with air space and rigid insulation).
(a) Reinforcing shall be adjustable (two-piece) ladder type, (Hohmann and Barnard, Inc., 270 Ladder Eye-Wire) with one side rod at each face shell of backing wythe and separate ties that extend into facing wythe. Ladder type reinforcing shall have 9 gauge side and cross wires. Ties shall have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties shall be 3/16” minimum diameter. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.
(b) Reinforcing shall be hot-dipped galvanized.
(c) Provide appropriate adjustable ties and corner assemblies as required.

(7) Column/Beam Anchors
(a) Tie Anchors shall be Hohmann and Barnard, Inc. Column Anchors No. 359, ¼” diameter wire, standard finish, for installation at columns and beams.
(b) Ties shall be Hohmann and Barnard, Inc., triangular or rectangular, ¼” diameter galvanized wire, size as required for installation as detailed.
(c) Wire anchors shall be welded to structural steel to provide ties at 1'-4” on center vertically and 1'-4” on center horizontally.
(d) Provide column flange anchors, Hohmann and Barnard, Inc., ¼” hot-dipped galvanized, where indicated on the drawings.

(8) Veneer Anchors
(a) Veneer anchors shall be Hohmann and Barnard, Inc., Veneer Anchors No. BL-407, hot-dipped galvanized, 12 gauge, with 3/16” diameter steel pintle.
(b) Veneer anchors at walls with CMU backup shall be Hohmann and Barnard, Inc., BL-5407. Refer to cavity masonry wall section above for additional requirements.
(c) Veneer anchors shall be spaced at 16” on center vertically and horizontally.

(9) Provide adjustable type reinforcing where necessary due to coursing requirements.

C. Control Joint Gasket
(1) Rubber shall conform to ASTM D-2000 2AA-805, with a Durometer hardness of 80 when tested in accordance with ASTM D-2240.
(2) Acceptable Products:
(a) Hohmann and Barnard, Inc. - Regular or wide flange rapid control joint.
(b) Ty-Wal - Regular or wide flange control joints.
(c) A-A - Tite-Wall or Blok-Tite control joints.
D. Through-Wall Flashing

(1) Through-wall flashing shall be self-adhering, flexible membrane flashing, 40 mils thick. This material shall be an air, vapor, and liquid moisture barrier. Provide self-adhering corners and end dams.

Acceptable manufacturer's are:

(a) W. R. Meadows, Seal Tight, air-shield thru-wall flashing.
(b) Hohmann & Barnard, Inc., Textroflash thru-wall flashing.

Products listed above shall be installed as outlined below and per the manufacturer’s recommendations:

(a) Surface to be applied shall be removed of all debris and cleaned with primer per manufacturer.
(b) All seams shall be sealed with a lap sealant recommended by the manufacturer.
(c) A stainless steel termination bar and sealant must also be used for application to the substrate.

(2) Drip edge flashing shall be “Hohmann & Barnard, Inc.” DP – Drip Plate”, stainless steel 1½” wide closed hemmed edge. Drip edge wide enough as the full width of the shelf angle. Drip edge shall be made of 22 gauge stainless steel conforming to ASTM A-666 Type 304.

D. Compressible Filler

(1) Asphalt impregnated cane fiber board shall be used except where sealant is to be used.
(2) Where sealant is to be used, the backing material shall be:

(a) Sealight "Backer Rod" - W. R. Meadows, Inc.
(b) Sonofoam "Backer Rod" - Sonneborn, Contech, Inc.

2.4 MORTAR AND GROUT MATERIALS

A. Cement

(2) Cement for use with white mortar shall be white.

B. Lime


C. Aggregate

(1) Shall conform to ASTM C-144, "Standard Specification for Aggregate for Masonry Mortar".
(2) Aggregate shall be limited to natural sand without lignite.
(3) Aggregate for use with colored or white mortar shall be white.
(4) Aggregates for use with grouts shall conform to ASTM C-404, "Standard Specification for Aggregates for Masonry Grout".

D. Mortar Color

(1) Mortar color shall be used with mortar for all face brick and elsewhere as noted.
(2) Mortar color shall be:
   (a) Soloman Grind-Chem Service Concentrated Mortar Color.
(3) The Architect will select colors from ("A" or "H") series.
(4) Sample panels (Part 1.2, A) shall demonstrate two mortar colors. The Architect will choose one color.

E. Grout
(2) Grout shall be fine grout for low-lift installations.

F. Mortar

G. Water: Shall be clean and potable.

H. Epoxy Mortar: Steelcote or Upco.

3. EXECUTION

3.1 GENERAL

A. Layout
(1) Do not accept former measurements. All walls shall be built between lines, the full thickness shown, and laid plumb, level, true to line, and with accurately spaced courses.
(2) Layout walls to avoid masonry units less than one-half stretcher.
(3) Use story rod to check vertical coursing.
(4) Vertical dimensions have been calculated according to the following:
   (a) Brick: 3 courses equal to 8”.
   (b) Concrete masonry: 2 blocks equal to 16”.
(5) Layout block cells to receive rebar reinforcing and coordinate vertical rebar spacing per structural requirements.

B. Bonding and Joint Finishing
(1) All face brick shall be laid in running bond, bonded to back-up with metal ties.
(2) All exterior joints shall be tooled concave as laid with 1⅛” diameter striking tool radius.
(3) Exposed concrete masonry shall be laid in running bond.
(4) Interior joints shall be tooled concave.
(5) All open and partially filled joints shall be pointed to match adjacent work.
(6) Exterior joints in brick sills shall be pointed with epoxy mortar and tooled concave.

C. Mortar Proportions and Properties
(1) For Brick Veneer Construction, Type "N" mortar, (750 psi average 28th day compressive strength)

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cubic foot Portland Cement</td>
<td></td>
<td>94 lbs.</td>
</tr>
<tr>
<td>1 cubic foot Hydrated Lime</td>
<td></td>
<td>40 lbs.</td>
</tr>
<tr>
<td>6 cubic feet Damp, Loose Sand</td>
<td></td>
<td>480 lbs.</td>
</tr>
</tbody>
</table>
Mortar color as required
(2) For General Masonry Construction, Type "S" mortar, (1800 psi average 28th day compressive strength)

1 cubic foot Portland Cement (94 lbs.)
½ cubic foot Hydrated Lime (20 lbs.)
4 cubic feet Damp, Loose Sand (320 lbs.)
Mortar color as required

(3) Grout Proportions

(a) Grout shall have a minimum compressive strength of 3000 psi at 28 days, using a 6 sack mixture of cement, sand and pea gravel.
(b) Mix grout to a consistency that has a slump between 8 and 11 inches.
(c) Provide design mix and cylinder test (ASTM C-476) results to show that the specified strength has been attained.

3.2 MORTAR MIXING AND HANDLING

A. All mortar shall be accurately proportioned and mixed in a power, drum-type mixer for 3 to 5 minutes after all ingredients have been placed in the mixer.
B. Mortar shall not be retempered.
C. Mortar shall not be used after it has stiffened nor after these time limits have expired:

   (1) 1½ hours after mixing when the ambient air temperature is 80° F or above.
   (2) Two hours after mixing when the ambient air temperature is less than 80° F.

D. Colored mortar shall be mixed in strict compliance with the manufacturer's printed directions and shall be consistent in proportion and uniform in color throughout the job.

3.3 PATCH WORK

A. Patch all masonry walls with material to match existing surface, toothed in and tuckpointed where left imperfect after demolition. Use material salvaged from demolition when available or new to match existing.

   (1) Locations where patching is required to include the following:

      (a) Where an intersecting wall was removed.
      (b) Where fixtures, accessories, brackets, etc., were removed.
      (c) Where doors or windows were removed.
      (d) Wall penetrations where ductwork, pipe, etc., were removed.
      (e) Where directed by the Architect.

4. CO-OPERATION WITH OTHER TRADES

4.1 GENERAL

A. Notify and consult with other trades in advance of masonry work to provide for installation of their work.
B. Chasing of exposed masonry shall not be permitted. Conduits, piping and other work shall be built-in as masonry work progresses.
C. Cut masonry units for outlets, pipes, fixtures, and other items. Location of the item is the responsibility of the trade involved.
D. Assist setting all frames in masonry work plumb, square, and secure. Fill metal frame heads and jambs with mortar as work progresses.
E. Build in all anchors, bolts, inserts, bucks, blocks, thimbles, grilles, and all other items furnished by this or other trade.
F. Rake joints ¾" minimum depth where required for flashing termination.
G. Provide pockets for built-in items and fill solid after installation. Masonry shall allow ½” clearance at ends of beams.

H. All cutting and patching of masonry required by other trades shall be done by the masonry contractor.

I. Install masonry wall metal access doors where indicated on drawings.

J. Set all loose lintels with particular care to assure correct positioning in relationship to wall face.

4.2 WORKMANSHIP

A. Step back unfinished work for joining with new work. Toothing shall not be permitted unless detailed.

B. Use masonry saw to cut all exposed units. Chipping or breaking of units will not be permitted.

C. All interior masonry walls shall extend up to the underside of the slab or deck above, except as noted. Fill in the top of the walls with grout.

D. The back of the exterior wythe of cavity walls shall be pargeted.

E. Isolate masonry units from steel columns with building paper or compressible filler.

F. All walls wider than 8” shall be built of two wythes, unless specifically detailed otherwise.

G. Fill all bed joints, head joints, and collar joints completely as laid and shove masonry units in place. Do not slush joints after laying.

H. Wet clay masonry before laying and keep damp as work progresses.

I. Concrete masonry units shall be kept dry until laid. Provide protective covering as required.

J. Vertical and horizontal joints shall be ⅜” wide.

K. Install flashing at all base courses, above all lintels, and below all sills and elsewhere as indicated on the drawings. NOTE: Flashing installed at base course (top of foundation offset) to extend a minimum of ¼” and a maximum of ½” from face of concrete. Flashing installed at lintels, sills, etc., to extend ¼” from face of wall.

L. Provide 32” long cotton rope wicks at 16” on center at the base course and at all locations of thru-wall flashing. Protect weep holes with nylon screen inside wall. Lay rope wicks through head joints and parallel in the cavity through to the exterior.

M. Keep all cavities and spaces between masonry veneer and frame clean and free of mortar droppings.

N. Install control and expansion joints where shown and as detailed.

O. Quality of chipped brick to be as specified under Section 1.2, D, 3.

4.3 REINFORCING

A. Except as noted otherwise, all of the following areas shall be GROUTED solid:

(1) All hollow masonry units for masonry cavities noted to have steel reinforcing rods or anchors.

(2) The bearing surface of all lintels for at least the greater of either the length of bearing, or eight inches, and at least 2'-0" vertically below the lintel bearing.

(3) All piers, pilasters, columns, or walls less than 2'-9" wide.

(4) All other masonry work subject to concentrated loads. (Consult Architect)

B. Bond masonry walls to intersecting concrete walls with dovetail anchors at 16” on center vertically.

C. Bond masonry walls to intersecting masonry walls with masonry bond or "Z" anchors 16” on center

D. Install masonry joint reinforcing as follows:

(1) Every 16” on center horizontally and vertically.

(2) At each course for three courses directly above lintels and below sills.

(3) At each course for the top three courses in load bearing walls.

E. Do not install masonry joint reinforcing across control joints. Allow ½" to 2” clearance on each side.

F. Install adjustable ties where vertical masonry coursing varies between wythes.
G. Masonry veneer shall be bonded to back up materials with masonry bond or wall ties. Use at least one tie for each 1.77 square feet of veneer and embed at least 2” into veneer bed joints.

H. Vertical reinforcing shall be installed where indicated on the drawings and shall lap a minimum of 30 bar diameters where splices are required.

I. Masonry contractor shall be responsible for providing and installing all structural reinforcement including, but not limited to, rebars, straps, anchors, ties, etc.

(1) The Masonry contractor shall be responsible for layout coordination and installation, including, but not limited to, welding of rebar, anchors, straps, ties, etc.

4.4 LINTELS

A. Take full responsibility for setting miscellaneous light steel angles at doorways and other short span openings.

B. Furnish and install reinforced concrete masonry lintels fabricated from lintel blocks, steel rebars and concrete fill. Each lintel shall have at least 8” bearing at each end.

C. Assist in setting heavy steel lintel beams, channels, or built-up sections. Lay masonry uniformly over the primary lintel member.

4.5 GROUTING

A. Grout (3000 psi) shall be installed at all block cells scheduled to be grouted solid and/or scheduled to receive vertical reinforcing.

B. The maximum height of a single grout lift shall not exceed five feet (5'-0") for low-lift grouting.

C. Grout shall be placed and allowed to set between 3-5 minutes and shall then be mechanically vibrated to consolidate the grout in the wall. Grout shall be held 1½” below the top of the masonry to form a key with the next section of wall. At the top of walls the grout shall be level with the top of the masonry.

4.6 CLEANING

A. Keep all work as clean as possible and remove excess mortar and droppings daily.

B. Exposed clay masonry shall be cleaned after mortar has set with 10% solution of muriatic acid. Rinse thoroughly after cleaning. Do not discolor or damage adjacent surfaces or materials.

C. Do not use acid on concrete masonry surfaces. Clean with trowel and brush after droppings are dry.

END OF SECTION 04200
SECTION 05000 - MISCELLANEOUS METAL

1. GENERAL

1.1 SCOPE
A. Provide materials, labor, equipment, and accessories required to complete the installation of miscellaneous metals described in the Contract Documents and specified herein.
B. Related work specified elsewhere:
   (1) Section 01035 - Alteration Work Procedures.
   (2) Section 01400 - Special Inspections and Testing.
   (3) Section 02050 - Demolition.
   (4) Section 03100 - Concrete and Cement Work.
   (5) Section 04200 - Masonry and Mortar Materials.
   (6) Section 06100 - Carpentry.
   (7) Section 06200 - Millwork.
   (8) Section 08100 - Metal Frames and Doors.
   (9) Section 08331 - Overhead Rolling Doors.
   (10) Section 08700 - Finish Hardware.
   (11) Section 09900 - Painting and Finishing.
   (12) Section 10155 - Toilet Partitions.
   (13) Section 10400 - Identification Devices.
   (14) Section 10500 - Lockers.
   (15) Section 10520 - Fire Protection Devices.
   (16) Section 10800 - Washroom Accessories.
   (17) Division 15 - Mechanical.
   (18) Division 16 - Electrical.

1.2 SHOP DRAWINGS
A. Submit in accordance with the conditions of the contract.

1.3 QUALIFICATIONS
A. For miscellaneous structural steel included in this section, qualifications shall be the same as stated under Section 05100, Structural Steel.
B. For miscellaneous items, qualifications will be based on the individual manufacturer's requirements selected in this section.
C. All work under this Section shall conform to the applicable provisions of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", as compiled by the American Institute of Steel Construction (AISC) latest edition, except as supplemented or amended herein and by the AISC.

2. PRODUCTS

2.1 MATERIALS - GENERAL
A. All materials shall be new.
B. Structural steel (wide flange shapes) - Shall conform to ASTM A-992.
C. Structural steel (other shapes and plates) - Shall conform to ASTM A-36.
D. Bolts - Shall conform to ASTM A-325, High-Strength Bolts. High-strength tension-set fasteners comparable to Series F9T (A-325), as manufactured by Construction Fasteners Systems, may be used on this project.
   (1) If tension-set fasteners are not used, then all bolted connections shall be tested in accordance with the requirements listed under Section 05100, Structural Steel, 3.7 "Quality Control Testing".
E. Structural tubing - Shall conform to ASTM A-500, Grade B.
F. Miscellaneous metals - Ferrous and non-ferrous cast, rolled or extruded materials as covered under specific headings.
G. Protective paint - Series 10 Tnemec Primers, modified alkyd rust-inhibitive primer; red or gray in color.
H. Provide welded stud bolts for anchorage of blocking and work of other trades as required.

2.2 MISCELLANEOUS ANGLES, PLATES, BOLTS, AND ANCHORS
A. Provide miscellaneous angles and/or plates for roof openings, joists supports, and wherever detailed or required to complete the work.
B. Provide anchor bolts, ½" diameter x 12" minimum for setting all wood plates and bucks in masonry or concrete as detailed or required. Provide anchor bolts 3'-0" on center for horizontal plates, but not less than two per plate.
C. Provide miscellaneous bolts, anchors, ties, etc., for attaching miscellaneous metal work as detailed or required.
D. Provide miscellaneous guard angles, angles for overhead doors as detailed.

2.3 BUMPER BOLLARDS (EXTERIOR)
A. Provide 4'-0" above finished grade, 6" O.D. standard weight galvanized steel pipe. Install in 3'-0" concrete and fill with concrete with rounded top.

2.4 BUMPER BOLLARDS (INTERIOR)
A. Provide 4'-0" above finish floor Omega Heavy Duty Corner Guard, floor mounted.

3. EXECUTION

3.1 FABRICATION
A. Fabricate steel in accordance with best shop practices and AISC Specifications.
B. Welding and cutting shall be in accordance with Code for Fusion Welding and Gas Cutting in Structural Building Code, formulated by the American Welding Society.
C. All exposed parts shall be continuously welded and ground flush and smooth.
D. Built-up members and sections shall be realigned after welding to produce straight and true members.
E. Measurements shall be verified at site where items are set or erected into work already built.
F. Exposed surfaces shall be free from rust, nicks, and burrs.
G. All work shall be adequately reinforced and accurately fitted with tight joints.
H. All steel work shall be painted with one coat of protective paint at the shop, as specified for structural steel, Section 05000, 2.1, G.
I. Anchoring devices shall be furnished as required for all items, and all work shall be punched for attachment of wood nailers and other materials.

3.2 INSTALLATION AND ERECTION
A. All work shall be erected complete or furnished to others as required. Inserts and prefabricated items designed to be built into concrete forms or masonry shall be furnished to the several trades for incorporation in their work. All items not otherwise noted shall be installed under this section.
B. The Contractor shall be responsible for furnishing items to the proper trades at the proper time, and shall be installed under this section.
C. Work shall be set true and plumb and shall be securely anchored by welding, bolting, or other adequate means. Field connections shall be bolted with bolts drawn tight and threads set so that nuts cannot become loose. Drifting to enlarge unfair holes is not permitted. Burning of holes is not permitted.
D. Field welds shall be ground flush and smooth and the prime coat of paint shall be touched up.
E. All manufactured items specified shall be installed according to the manufacturers specifications and as detailed on the drawings.

END OF SECTION 05000
1. GENERAL

1.1 SCOPE

A. Description

(1) This specification covers the complete on-site fabrication and construction of wood-related building elements. This specification includes furnishing material, labor, tools, and equipment necessary to complete the wood-related work throughout the interior and the exterior of the building.

(2) Several building elements, both wood-related and not wood-related, shall be fabricated elsewhere and delivered to the project site for storage, handling, and installation under this section. Some of the major items are listed below, but not limited to the following:

(a) Section 03100 - Concrete and Cement Work.
(b) Section 06200 - Millwork.
(c) Section 08100 - Metal Frames and Doors.
(d) Section 08200 - Wood Doors.
(e) Section 08331 - Overhead Rolling Doors
(f) Section 08500 - Metal Windows.
(g) Section 08700 - Finish Hardware.

(3) Some wood-related work (example: concrete formwork) requiring on-site fabrication is specified in other sections. The Carpentry Contractor shall become thoroughly familiar with all sections of this specification and all their provisions regarding carpentry work and installation under this section. All building elements that are left uninstalled under the requirements of other sections shall be installed as a part of this work.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01035 - Alteration Work Procedures.
(3) Section 01400 - Special Inspections and Testing.
(4) Section 02050 - Demolition.
(5) Section 03100 - Concrete and Cement Work.
(6) Section 06200 - Millwork.
(7) Section 07600 - Sheet Metal.
(8) Section 07900 - Caulking and Sealants.
(9) Section 08100 - Metal Frames and Doors.
(10) Section 08200 - Wood Doors.
(11) Section 08331 - Overhead Rolling Doors.
(12) Section 08400 - Aluminum Entrance Work.
(13) Section 08500 - Metal Windows.
(14) Section 08700 - Finish Hardware.
(15) Section 08800 - Glass and Glazing.
(16) Section 09250 - Gypsum Wallboard (Drywall).
(17) Section 09986 - Sanitary Wall Panels.
(17) Section 10155 - Toilet Partitions.
(18) Section 10260 - Wall Corner Guards.
(19) Section 10400 - Identification Devices.
(20) Section 10500 - Lockers.
(21) Section 10520 - Fire Protection Devices.
(22) Section 10800 - Washroom Accessories.
(23) Section 12300 - Ready-Made Casework.
1.2 QUALITY ASSURANCE

A. Products

(1) All dimension and board lumber shall be stamped for grade including appearance grade where applicable.
(2) All dimension and board lumber shall be new and kiln dried to a moisture content of 19% or less, and stamped S-DRY, surfaced four sides (S4S).
(3) Appearance graded lumber shall be free of all defects that would impair its appearance.
(4) All sanded plywood products shall be new and stamped with veneer grades, species group, type of glue, product standard governing manufacturer, mill number, and APA seal.
(5) All unsanded plywood products shall be new and stamped with type of sheathing, type of glue, panel span index, product standard governing manufacturer, mill number, and APA seal.
(6) No asbestos-containing materials or products shall be provided or installed.

B. Workmanship

(1) Highest quality workmanship is required.
(2) Employ only skilled and experienced craftsmen.

1.3 SUBMITTALS

A. Submit product data for all items in accordance with the conditions of the Contract.
B. Provide actual color selection samples to the Architect where a color selection is required.

2. PRODUCTS

2.1 DIMENSION AND BOARD LUMBER

A. Structural Joists and Planks

(1) All members (nominal) 2" to 4" thick and 6" and wider are, by definition, structural joists and planks.
(2) Grade shall be select structural, No. 1 Douglas Fir or No. 1 Southern Yellow Pine.
(3) Minimum bending stress, f, shall be 1500 psi, and minimum modulus of elasticity, e, shall be 1,800,000 psi.

B. Structural Light Framing

(1) All members (nominal) 2" to 4" thick and 2" to 4" wide are, by definition, structural light framing members.
(2) Grade shall be select structural, No. 2 Douglas Fir, or No. 2 medium grain Southern Yellow Pine.
(3) Minimum bending stress, f, shall be 1400 psi, and minimum modulus of elasticity, shall be 1,600,000 psi.

2.2 PLYWOOD AND SHEET GOODS

A. Exterior Products

(1) Gypsum Sheathing: ½" thick (R = .56 minimum), 4' x 8', 4' x 9', or 4' x 10' sheets:
   (a) Dens Glass Gold exterior gypsum board sheathing manufactured by Georgia Pacific Company.
   (b) BPB Architectural Products, GLASROC Premium Exterior Sheathing.
(2) Building paper: Type 1 - 15 lb./100 s.f., asphalt-saturated felt. The material shall conform to ASTM D-226, "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing". The felt shall be produced from fiberglass fibers.

(3) Polyethylene sheeting: Clear or black, 6 mil. thickness.

(4) Water Resistant Barrier:
   (a) Tyvek CommercialWrap by DuPont Company, Wilmington, DE. Install with DuPont contractor tape and provide fasteners as recommended by the manufacturer.
   (b) Green Guard "Classic Wrap" by Pactiv Building Products, Atlanta, GA. Install with manufacturer’s recommended tape and fasteners.

2.3 TREATED LUMBER AND PLYWOOD

A. General
   (1) Board or dimension lumber identified as treated shall meet or exceed the specifications stated under Part 2.1 of this specification.
   (2) All proprietary names and trademarks used in this specification refer to products of Koppers Company, Inc.
   (3) Products of these other specified manufacturers will generally be acceptable if the specific product is submitted to the Architect for approval and the Architect determines that the product meets or exceeds this specification:
      (a) Hoover Universal, Pine Bluff, AR.
      (b) Niedermeyer-Martin Co., Portland, OR.
      (c) Osmose Wood Preserving Co., Buffalo, NY.
   (4) Treatments shall meet or exceed the following standards of the American Wood Preserves Institute:
      (a) Lumber above ground, soil, and water - C2.
      (b) Plywood - C9.
      (c) Foundation piles on land and fresh water - C3.
      (d) Poles for construction C23.
      (e) Laminated wood - C28.
   (5) All treated lumber and plywood shall be stamped with the minimum preservative retention, or the appropriate following AWPB markings:
      (a) Lumber for above ground use treated with ACQ - Alkaline Copper Quartenary.
      (b) Lumber for laminating and plywood for above ground use treated with penta in volatile hydrocarbon solvent, "Cellon" - LP4.
      (c) Lumber and Plywood in foundations treated with waterborne salts, ACQ - Alkaline Copper Quartenary.
      (d) Lumber for laminating and plywood for soil and fresh water contact treated with penta in volatile hydrocarbon solvent, "Cellon" - LP44.
      (e) Lumber for soil and fresh water contact treated with waterborne salts, ACQ - Alkaline Copper Quartenary.

B. Decay and Insect Resistant Treated Lumber and Plywood Lumber
   (1) Waterborne treatment for board and dimension softwood lumber.
      (a) All treated lumber shall be ACQ - Alkaline Copper Quartenary.
      (b) Lumber treated in this manner shall remain suitable for painting or staining.
(2) Liquified butane gas borne treatment for laminated wood and plywood.

(a) All treated lumber to be used in laminating and all treated plywood shall be "Cellon" treated with pentachlorophenol preservative pressure, impregnated into the wood to the following minimum quantities:

1) Above ground laminating lumber - 0.23 pounds of preservative per cubic foot of lumber.
2) In ground laminating lumber - 0.60 pounds of preservative per cubic foot of lumber.
3) Above ground plywood up to ⅝" thick - 0.40 pcf.
4) In ground plywood up to ⅝" thick - 0.60 pcf.

(b) Lumber and plywood treated in this manner shall remain suitable for painting or staining and shall retain the woods original texture and color.

C. Fire-Retardant Treated Lumber and Plywood

(1) General

(a) All treated wood shall be identified by an Underwriters' Laboratory Label certifying U.L. "FR-S" fire hazard classification and exterior products shall bear this statement, "No increase in the listed classification when subjected to the standard rain test", and shall also bear the factory mutual diamond.

(b) Under test conditions, the treated material shall have a flame spread, fuel contribution and smoke development classification of 25 or less.

(c) All fire-retardant treated lumber and plywood shall be treated with "Dricon" as manufactured by Hickson Corporation or "Pyro-Guard" as manufactured by Hoover Treated Wood Products.

(d) All fire-retardant treated lumber and plywood must meet the requirements of AWPA Standards C-20 and C-27.

(e) All treated lumber shall be kiln dried after treatment to a moisture content of 19% or less.

(f) The fire retardant chemicals shall be Halogen and sulfate free and shall not accelerate the deterioration of conduit, pipes, or other metal.

(g) Wood supplied shall be suitable for painting.

2.4 MISCELLANEOUS MATERIALS

A. Rough Hardware

(1) General: All rough hardware and securing devices used in exterior applications, areas of high humidity, and in treated lumber and plywood shall be hot-dipped galvanized, or Type 304, or 316 stainless steel.

(2) Nails: Common, cold-drawn wire; special types, such as casing, finishing ring shank, roofing, double-head, etc., shall be supplied as required for all work. Sizes shall be as listed in the "Recommended Nailing Schedule" of the BOCA and IBC Building Code, latest edition.

(3) Powder-Set Fasteners: Hilti or ITW Ramset/Red Head Fastening Systems. Specific fasteners shall be as recommended by the manufacturer for the backing material involved.

(4) Expansion Bolts: ITW/Ramset Red Head "Trubolt" or Hilti "Kwik-Bolt" wedge anchors for concrete, and ITW/Ramset Red Head "Dynabolt" or Hilti "Hol-Hugger" sleeve anchors for masonry.

(5) Wood Screws: Shall hot dipped galvanized or Type 304, or 316 stainless steel with flat blade heads for concealed and exposed locations.

(6) Framing anchors: Timber connectors, joist bridging and hangers, post bases, connectors, and caps shall be 16 gauge, minimum galvanized steel. Acceptable manufacturers are:
(a) Cleveland Sheet Specialty Co.
(b) Harlen Metal Products, Inc.
(c) Heckmann Building Products
(d) Kant-Sag, United Steel Products Co.
(e) Silver Metal Products
(f) Simpson Company
(g) Teco Company

(7) **Plywood clips**: Extruded aluminum alloy 6063-T-6.
(8) **Clip angles**: 3" x 3" x 3/16" (min.) heavy-duty, galvanized steel with ⅝" diameter bolt holes.

**B. Miscellaneous Items**

(1) **Screen cloth**: Aluminum or bronze wire, 18 mesh, 0.017" diameter wire, including matching staples.
(2) **Hardware cloth**: Galvanized steel wire cloth, 4 mesh, 23 gauge wire.

**3. EXECUTION**

**3.1 GENERAL**

**A. Treated Wood**

(1) Fire-retardant treated lumber cannot be used in the ground or in contact with the ground.
(2) "Dricon" fire retardant treated lumber may be end cut, but ripping or resurfacing shall not be permitted.
(3) All wood in contact with steel, concrete or masonry shall be decay and insect resistant treated.

**3.2 FRAMING, SHEATHING, AND MISCELLANEOUS CARPENTRY**

**A. General Framing**

(1) Unless noted otherwise, wood framing shall be 16" on center with double top plate and single sole plate.
(2) Double studs adjacent to all openings.
(3) Fire stop all vertical spaces exceeding 4'-6".

**B. Sheathing**

(1) Structural wall sheathing shall be installed vertically.
(2) All joints shall occur over a framing member or rigid blocking.
(3) Plywood roof sheathing shall be installed with long dimension perpendicular to framing and with panel clips at all free edges.
(4) Provide manufacturer's recommended spacing between plywood sheathing for expansion; ⅛" at panel ends and ¼" at panel edges.
(5) Install (insulation board or insulation sheathing) vertically for 4' x 8' sheets or horizontally for 2' x 8' sheets.

**C. Water Resistant Barrier**

(1) Install in accordance with Manufacturer's instruction over exterior sheathing and under foam board. Seal joints and penetrations through air infiltration barrier with specified tape and fasteners prior to installation of finish material. Air infiltration barrier shall be air-tight and free from holes, tears and punctures. All window and door penetrations are to be taped per manufacturer instructions.
D. Miscellaneous:

(1) Furnish, for installation under Section 04200, Masonry, enough felt to serve as "bond-break" where indicated on drawings or where specified.
(2) Furnish and install screen cloth where indicated on drawings.
(3) Wood grounds shall be accurately and rigidly provided where noted or needed.
(4) Provide wood bucks at doors and windows as noted or required.
(5) Fabricate and install plastic laminate covered window stools. Stools may be laminated at the site with waterproof contact cement. All exposed sides and edges shall be covered with plastic laminate.
(6) Provide and install minimum 2" x 12" blocking as required and where noted (i.e., wall cabinets, etc.).

3.3 MILLWORK

A. See Section 06200, Millwork, for storage, handling, and installation.

3.4 INSTALLATION OF METAL DOORS AND FRAMES

A. See Section 08100, Metal Frames and Doors, for storage, handling, and installation.

3.5 WOOD DOORS

A. See Section 08200, Wood Doors, for storage, handling, and installation.

3.6 WINDOWS

A. See Sections 08500, Metal Windows, for storage, handling, and installation.

3.7 FINISH HARDWARE

A. See Section 08700, Finish Hardware, for storage, handling, and installation.

END OF SECTION 06100
SECTION 06200 - MILLWORK

1. GENERAL

1.1 SCOPE
   A. Furnish and install trim, casework and countertops, paneling, stair and handrail items, wood door frames, blinds and shutters, and miscellaneous ornamental items.
   B. Related work specified elsewhere:
      (1) Section 01035 - Alteration Work Procedures.
      (2) Section 02050 - Demolition.
      (3) Section 05000 - Miscellaneous Metal.
      (4) Section 06100 - Carpentry.
      (5) Section 08200 - Wood Doors.
      (6) Section 08500 - Metal Windows.
      (7) Section 09250 - Gypsum Wallboard (Drywall).
      (8) Section 09900 - Painting and Finishing.
      (9) Section 12300 - Ready-Made Casework.

1.2 SUBMITTALS
   A. Submit shop drawings in accordance with the conditions of the Contract. Mouldings and trim shall be drawn full scale.
   B. Submit manufacturer's brochures for items not manufactured by the mill.

1.3 WARRANTIES
   A. Millwork shall be warranted against all defects in workmanship and material for a period of two (2) years from the date of Substantial Completion as defined in the conditions of the Contract.

1.4 REFERENCE STANDARDS
   A. All work shall meet the quality standards of the Architectural Woodwork Institute (AWI) listed in these specifications.

2. PRODUCTS

2.1 GENERAL
   A. All wood shall be kiln dried and contain not more than 10% moisture when milled.
   B. All wood used for exterior work shall be treated with not less than a three minute dip in 5% pentachlorophenol with water repellents added. Label all material treated in this manner.

2.2 SOLID STOCK FOR STANDING OR RUNNING TRIM
   A. Stock exposed to view shall be as specified. Unexposed stock shall be as permitted by AWI Standards for custom grade work.
   B. Interior stock, transparent finish:
      (1) Grade: Premium, in accordance with AWI Standard 100-1.
      (2) Species: Plain sawn Natural Birch.
   C. Interior stock, opaque finish:
      (1) Grade: Economy, in accordance with AWI Standard 100-1.
      (2) Species: Sap Poplar.
2.3 PLYWOOD AND SHEET MATERIALS

A. Plywood exposed to view shall be as specified. Unexposed plywood shall be as permitted by AWI Standards for custom grade.

B. Interior plywood, opaque finish:

(1) Veneer: Medium density overlay (exposed, "C" plugged unexposed).

C. Exterior plywood:

(1) Specified under Section 06100, Carpentry.

D. Particle board:

(1) Medium density conforming to Commercial Standard C.S. 236, Type 1-B-2.

E. Plastic laminates:

(1) Acceptable manufacturers:
   (a) Formica Corporation.
   (b) Wilson Art.
   (c) Nevamar.
   (d) Pionite.

(2) Types and applications:
   (a) 0.050" general purpose type: For all countertops, exposed horizontal interior surfaces of open (doorless) units, and exposed vertical cabinet exterior surfaces over 2'-0" wide.
   (b) 0.040" post forming type: For all post-formed surfaces.
   (c) 0.030" vertical surface type: For all exposed vertical interior surfaces of open (doorless) units and all exposed, vertical cabinet exterior surfaces under 2'-0" wide.
   (d) 0.025" cabinet liner type: For all exposed interior surfaces of cabinets except open (doorless) units.
   (e) Balancing sheet type: Use thickness the same as material to be balanced.

(3) Color and pattern: Architect will select from plastic laminate manufacturer's complete line of solid or woodgrain colors and patterns.

(4) Finish: Comparable to Formica Corporation "Suede".

2.4 SOLID SURFACE TOPS

A. Lavatory countertops shall be Corian as manufactured by DuPont. Colors shall be selected by the Architect from the manufacturer's full range of available colors (all series).

B. Thickness: ½" solid material.

C. Profile, style and details shall be as shown on the drawings.

D. Comparable products by Formica solid surfacing (all series), Avonite (all series), and Wilsonart (all series) are also acceptable when meeting or exceeding the requirements of the product specified.

E. All lavatory countertops shall be provided with a ten (10) year installed warranty that covers material, fabrication and installation.
3. EXECUTION

3.1 GENERAL

A. Millwork shall not be delivered to the building prior to ten (10) days after operations involving substantial amounts of water have been completed, during which time the building shall have been maintained at a temperature of not less than 70° F.
B. Millwork shall be protected from moisture and mechanical damage during delivery.
C. Take field measurements and make full-scale templates as necessary before fabricating work.
D. Install work level and tightly fitted to adjacent walls and building elements. Set nails and leave work clean and ready for use by Owner.
E. Furnish trim and scribe strips extra long for field cutting to size.
F. Protect installed work from scratches, dirt, chips, and other damage. Repair or replace all damaged work before acceptance by Owner as directed by the Architect.

3.2 STANDING AND RUNNING TRIM

A. Shall conform to AWI Quality Standard 300-1, 300-2, 300-3, and 300-4 for "custom" grade.
B. All door frames and casings shall be in-plant mitered, splined, and glued in accordance with AWI Standard 300-5 for "custom" grade.
C. Kerf the back of all standing trim.

3.3 PLASTIC LAMINATE WORK

A. All exposed areas, edges, and splashes shall be covered with plastic laminate of the gauge specified.
B. Glue laminate to particle board core with laminate manufacturer's approved adhesive.
C. Install balance sheet of same gauge as finished laminate.
D. Provide laminate lined cut-outs in countertops for all lavatories. Coordinate with plumbing subcontractor to assure accuracy.
E. Provide continuous runs of countertops in 12'-0" lengths. Minimize seams at corners and changes of direction.

END OF SECTION 06200
1. GENERAL

1.1 SCOPE

A. Provide materials, labor, equipment and accessories required to complete the building insulation work described in the Contract Documents.

B. Related work specified elsewhere:

   (1) Section 01035 - Alteration Work Procedures.
   (2) Section 02050 - Demolition.
   (3) Section 03100 - Concrete and Cement Work.
   (4) Section 04200 - Masonry and Mortar Materials.
   (5) Section 05100 - Structural Steel.
   (6) Section 06100 - Carpentry.
   (7) Section 06200 - Millwork.
   (8) Section 07600 - Sheet Metal.
   (9) Section 07900 - Caulking and Sealants.
   (10) Section 08100 - Metal Frames and Doors.
   (11) Section 09250 - Gypsum Wallboard.
   (12) Section 09500 - Acoustical Ceilings.
   (13) Division 15 - Mechanical.
   (14) Division 16 - Electrical.

2. PRODUCTS

2.1 INSULATION

A. Hollow Concrete Masonry Insert Insulation

   (1) All concrete masonry units noted to be insulated shall have factory-installed inserts of expanded polystyrene insulation having a minimum density of 1.3 lbs. per cubic foot.
   (2) Acceptable products are:

      (a) Korfil block insulation.

B. Rigid Cavity Wall Insulation

   (1) Shall be of thickness shown on drawings.
   (2) Acceptable products (extruded polystyrene, ASTM C-578) are:

      (a) Dow Chemicals - Styrofoam Square Edge
      (b) UC Industries - Foamular Square Edge

C. Batt Insulation

   (1) Kraft-Faced Insulation: Glass fiber insulation with Kraft paper vapor barrier as manufactured by Owens-Corning Fiberglass.
   (2) Foil-Faced Insulation: Glass fiber insulation with a foil vapor barrier as manufactured by Owens-Corning Fiberglass. Insulation shall have a maximum flare spread rating of 25.
   (3) Unfaced Insulation: Glass fiber insulation as manufactured by Owens-Corning Fiberglass.

D. Extruded Polystyrene Insulation; thickness as detailed:

   (1) “Styrofoam SM” - Dow Chemical Company.
   (2) “Foamular” - UC Industries.
E. Sound Attenuation Blankets: 2” Thermafiber. Comparable products by Owens-Corning, CertainTeed and Mansville are also acceptable when meeting or exceeding the requirements of the specified product.


3. EXECUTION

3.1 INSTALLATION

A. Install insulation where indicated by wall types.
B. Install insulation inside wall forms, earthformed or edge of slabs, as required.
C. Insulate all framed exterior walls.
D. Insulate at gaps and cracks around all doors and windows.
E. Install insulation with vapor barrier to inside.
F. Install rigid insulation in convector recesses occurring in exterior walls.
G. Insulate between all heating and water piping and exterior side of outside walls.
H. Insulate all exterior wall block and wall cavities.

(1) Concrete masonry cells shall have masonry inserts or masonry foam fill insulation.
(2) Wall cavities shall have rigid board insulation.

3.2 CLEAN UP

A. Remove all debris and surplus material from work areas.
B. Leave all work clean and ready to receive finish materials.

END OF SECTION 07210
SECTION 07240 - EXTERIOR INSULATION FINISHING SYSTEM (EIFS)

1. GENERAL

1.1 SECTION INCLUDES

A. Materials and installation of Class PB Drainage EIFS System utilizing Dryvit Outsulation LCMD /Light Commercial Drainage System – LCMD3 System.

1.2 RELATED SECTIONS

A. Section 03100 - Concrete and Cement Work.
B. Section 04200 - Masonry and Mortar Materials.
C. Section 06100 - Carpentry.
D. Section 07600 - Sheet Metal.
E. Section 07900 - Caulking and Sealants.
F. Section 09250 - Gypsum Wallboard (Drywall).

1.3 REFERENCED DOCUMENTS

A. Dryvit Outsulation LCMD Systems 1-5 Application Instructions, DS172
B. Dryvit Outsulation RMD/LCMD Systems 1-5 Installation Details, DS170
C. ASTM Standards
   (1) B-117  Test method for salt spray (fog) testing.
   (2) C-67   Method of sampling and testing brick and structural clay tile.
   (3) C-1396 Formally C 79, Test method for gypsum sheathing board.
   (4) C-150  Specification for Portland cement.
   (5) C-297  Test method for tensile strength of flat sandwich constructions in flatwise plane.
   (6) C-578  Specification for preformed, cellular polystyrene thermal insulation.
   (7) C-1135 Test method for determining tensile adhesion properties of structural sealants.
   (8) C-1177 Specification for glass mat gypsum substrate for use as sheathing.
   (9) C-1186 Specification for flat non-asbestos fiber-cement sheets.
   (10) C-968  Test method for abrasion resistance of organic coatings by falling abrasive.
   (11) D-2247 Practice for testing water resistance of coatings in 100% relative humidity.
   (12) D-2898 Test for Accelerated Weathering of Fire-Retardant Treated Wood.
   (13) D-3273 Test for resistance to growth of mold on the surface of interior coatings in an environmental chamber.
   (14) D-4060 Test for Abrasion Resistance of Organic Coatings by the Tabor Abraser
   (15) D-4258 Standard practice for surface cleaning concrete for coating.
   (17) E-84   Test method for surface burning characteristics of building materials.
   (18) E-96   Test method for Water Vapor Transmission of Materials
   (20) E-119  Method for fire tests of building construction and materials.
   (22) E-331  Test method for water penetration of exterior windows, curtain walls and doors by Uniform Static Air Pressure Difference.
   (23) E-695  Method for measuring relative resistance of wall, floor and roof constructions to impact loading.
   (24) E-2098 Test method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for use on Class PB EIFS
   (26) E2273 Test method for Determining Drainage Efficiency of EIFS
   (28) E2485 Formally EIMA Std. 101.01, Standard Test Method for Freeze-Thaw Resistance of EIFS and Water Resistance Barrier Coatings
D. Building Code Standards – Current Applicable Jurisdiction Building Code, but not less than;

E. Gypsum Association
   (2) GA-253 Application of Gypsum Sheathing.
   (3) GA-254 Fire Resistant Gypsum Sheathing.

F. American Plywood Association
   (1) J20G Grades and Specifications Guide.
      (a) APA Exterior Exposure 1 rated Plywood, grade C-D or better, nom. ½” min., 4-ply.
      (b) APA Exterior Exposure 1 rated Oriented Strand Board (OSB), ½” min.

G. Proprietary Specifications
   (1) A468 Georgia-Pacific Corporation, “Dens Glass Gold Sheathing”.

1.4 DESIGN REQUIREMENTS

A. Design for maximum allowable system deflection, normal to the plane of the wall, of L/360.
B. Design for wind load in conformance with code requirements.
C. Prevent the accumulation of water behind the system, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly.
D. Install ultra high impact mesh in accordance with Section 2.9.A.2, Mesh Specifications and “Instructions for installation of the Class PB Exterior Insulation and Finish System (EIFS)”, for use on all ground floor elevations and other areas of anticipated impact or abuse. Per ASTM E2486, as detailed and described in the contract documents.
E. Select finish coat with a lightness value of 20 or greater. (The use of dark colors is not recommended with EIF Systems that incorporate polystyrene insulation board).
F. Design minimum ¾” (19 mm) wide expansion joints in the EIFS where they exist in the substrate or supporting construction, where the EIFS adjoins dissimilar construction or materials, at changes in building height, and at floor lines in multi-level wood-frame construction.
G. Design minimum \( \frac{1}{2}" \) (13 mm) wide sealant joints at penetrations through the EIFS (windows, doors, expansion joints, floor lines in wood frame construction, floor lines of non-wood framed buildings where significant movement is expected, abutment to dissimilar materials, where substrate type changes, were prefabricated panels abut each other, in continuous elevations not exceeding 75 ft., where structural movement occurs such as changes in roof line, building shape, parapet wall height variation, structural system change and other manufacturer recommendations, etc.).

H. Specify compatible backer rod and sealant in accordance with “EIMA Guide for Use of Sealants with Exterior Insulation and Finish Systems (EIFS), Class PB”. Specify sealant in compliance with minimum 50% elongation requirement before and after conditioning when tested in accordance with EIMA Standard 300.01.

I. Do not specify EIFS for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. For below grade applications, see manufacturers recommendations, specifications and installation requirements. Obtain Manufacturers approval prior to any EIFS installation below grade and review with Architect prior to installation.

J. Sloped surfaces: Minimum slope is 1:2 (27°) and maximum width is 12” (300 mm). Sot Mesh embedded in Dryvit mesh is required beneath finish coating. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Periodic inspections and increased maintenance of coating are required. Refer to Manufacturers standard details.

1.5 PERFORMANCE REQUIREMENTS

A. SYSTEM PERFORMANCE - DURABILITY

<table>
<thead>
<tr>
<th>Test</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerated Weathering</td>
<td>ASTM G-23, G-53, G-154, G-155</td>
</tr>
<tr>
<td>Freeze/Thaw Resistance</td>
<td>ASTM E2485</td>
</tr>
<tr>
<td>Water Penetration</td>
<td>ASTM C-67, E-331</td>
</tr>
<tr>
<td>Tensile Adhesion</td>
<td>ASTM C-297, 2134E</td>
</tr>
<tr>
<td>Water Resistance</td>
<td>ASTM D-2247</td>
</tr>
<tr>
<td>Salt Spray Resistance</td>
<td>ASTM B-117</td>
</tr>
<tr>
<td>Abrasion Resistance</td>
<td>ASTM D-968</td>
</tr>
<tr>
<td>Mildew Resistance</td>
<td>ASTM D-3273</td>
</tr>
<tr>
<td>Tabor Abrasion</td>
<td>ASTM D-4060</td>
</tr>
<tr>
<td>Water Vapor Transmission</td>
<td>ASTM E-96</td>
</tr>
</tbody>
</table>

B. SYSTEM PERFORMANCE - FIRE

<table>
<thead>
<tr>
<th>Test</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Burning Characteristics</td>
<td>ASTM E-84</td>
</tr>
<tr>
<td>Full-Scale Multi Story Fire Test</td>
<td>NFPA 285</td>
</tr>
<tr>
<td>Ignition</td>
<td>NFPA 286</td>
</tr>
<tr>
<td>Surface Burning</td>
<td>ASTM E-84</td>
</tr>
</tbody>
</table>

C. SYSTEM PERFORMANCE - STRUCTURAL

<table>
<thead>
<tr>
<th>Test</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Resistance</td>
<td>ASTM E2486</td>
</tr>
<tr>
<td>Mesh</td>
<td></td>
</tr>
<tr>
<td>Standard – 4.3oz/yd² - 146g/m² – Standard Classification</td>
<td></td>
</tr>
<tr>
<td>Standard Plus – 6.0oz/yd² - 203g/m² – Medium Classification</td>
<td></td>
</tr>
<tr>
<td>Intermediate – 12.0oz/yd² - 407g/m² – High Classification</td>
<td></td>
</tr>
<tr>
<td>Panzer 15 – 15.0oz/yd² - 509g/m² - Ultra High Classification**</td>
<td></td>
</tr>
<tr>
<td>Panzer 20 – 20.0 oz/yd² - 695g/m² - Ultra High Classification**</td>
<td></td>
</tr>
<tr>
<td>Detail Mesh – 4.3oz/yd² - 146g/m²</td>
<td></td>
</tr>
<tr>
<td>Corner Mesh – 7.2oz/yd² - 244g/m²</td>
<td></td>
</tr>
</tbody>
</table>

(** shall be used as minimum for areas exposed to high traffic)

| Tensile Bond | ASTM C297, E2134 |
| Transverse Wind Load | ASTM E330 |
D. COMPONENT PERFORMANCE - DURABILITY

Test
Alkali Resistance of Reinforcing Mesh  EIMA 105.01
Physical Properties and Requirement for EPS Board  ASTM C-578

1.6 SUBMITTALS

A. Dryvit Systems, Inc., Manufacturer’s specifications, product data, details, installation instructions, etc.
B. Applicator’s certificate of instruction and installation by Manufacturer.
C. Samples for approval as directed by Architect or Owner.
D. Manufacturer’s code report.
E. Manufacturer’s standard warranty.
F. A list of minimum three (3) completed project references.
G. Manufacturer’s certificate of compliance with EIMA standards.
H. EPS board manufacturer’s certificate of compliance with EIMA standard 300.01.
I. Sealant manufacturer’s certificate of compliance with EIMA standard 300.01.
J. Prepare and submit project-specific details (required by contract documents).

1.7 QUALITY ASSURANCE

A. Manufacturer Requirements

(1) Member in good standing of the EIFS Industry Members Association (EIMA).
(2) System manufacturer for a minimum of fifteen (15) years.
(3) System recognized for intended use by the national codes and by the local code agency with jurisdiction over the project.
(4) System listed by a nationally recognized test agency.

B. Contractor Requirements

(1) Engaged in application of Class PB EIFS for a minimum of three (3) years.
(2) Knowledgeable in the proper use of handling of Dryvit materials.
(3) Employ skilled mechanics who are experienced and knowledgeable in Class PB EIFS application, and familiar with the requirements of the specified work.
(4) Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
(5) Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Dryvit's published specifications and details and the project plans and specifications.

C. Insulation Board Manufacturer Requirements

(1) Recognized by Dryvit as capable of producing insulation board to meet system requirements, and hold a valid licensing agreement with Dryvit.
(2) Listed by an approved agency.
(3) Label insulation board with information required by Dryvit, the approved listing agency and the applicable building code.

D. Mock-up Panel

(1) Contractor to prepare a complete mock-up panel, approximate size 4’x4’ or other approved size by the Architect. Include base edge, flashing, edge and joint conditions, finish and approved color on the mock-up panel for review and approval by the Architect prior to commencing work.
1.8 DELIVERY, STORAGE AND HANDLING
A. Deliver all EIFS materials in their original sealed containers bearing manufacturer’s name and identification of product.
B. Protect coatings (pail products) from freezing and temperatures in excess of 90° F (32° C). Store away from direct sunlight.
C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.9 PROJECT/SITE CONDITIONS
A. Maintain ambient and surface temperatures above 40° F (4° C) during application and drying period, minimum 24 hours after application of EIFS.
B. Provide supplementary heat for installation in temperatures less than 40° F (4° C).
C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.10 COORDINATION/SCHEDULING
A. Install flashings, copings and sealant immediately after installation of the system and when EIFS coatings are dry.

1.11 WARRANTY
A. Provide manufacturer’s standard Ten (10) Year labor and material warranty. Including 10 year moisture drainage and materials warranty.

2. PRODUCTS

2.1 MANUFACTURERS
A. Dryvit, Inc. System specified herein. Comparable systems by STO Corporation, and Senergy are acceptable when meeting or exceeding the system specifications.
B. Provide and install all EIFS components from a single source EIFS manufacturer or approved supplier.

2.2 SURFACE PREPARATION
A. Conditioner
   (1) An acrylic based surface conditioner (used for chalking surfaces or excessively absorptive concrete, plaster or masonry).
B. Leveler
   (1) Dryvit - One-component, polymer-modified cement-based leveler with fiber reinforcement (used for concrete, or plaster surfaces; for leveling up to 1/4” (6 mm).

2.3 Sheet Type Membranes (by others)
A. Code approved water resistive barrier and drainage medium is Dupont Tyvek Stucco Wrap, minimum.
B. Fluid applied membranes – where permissible and in compliance with applicable building codes and approved by the manufacturer with the specified system.
2.4 Flashing Materials – used to protect substrate edges at terminations
   A. Shall be Flashing Tape and Surface Conditioner – Dryvit Flashing Tape, high density polyethylene film backed with rubberized asphalt adhesive, 4, 6 & 9 inch wide rolls
   B. Dryvit Flashing Conditioner – water based surface conditioner and adhesion promoter for the Dryvit Flashing Tape.

2.5 Drainage Track – UV Treated PVC perforated channel with weep holes, comply with ASTM D1784, C1063. Not required when drainage Strip is specified.
   A. Drainage Track usage is limited to the base of the system at finished grade level installing system in noncombustible construction. All other horizontal terminations shall utilize the Dryvit Drainage Strip as shown on Outsulation LCMD Systems 1-5 Installation Details.
      (1) Starter Trac STWP – without drip edge by Plastic Components
      (2) Starter Trac STDE – with drip edge by Plastic Components
      (3) Universal Starter Track – by Wind-Lock Corp.
      (4) Sloped Starter Strip – with Drip by Vinyl Corp.
   B. Dryvit Drainage Strip – corrugated plastic strip providing drainage. Required when using Tyvek Stucco Wrap without Drainage Track.
   C. Drainage Medium – Tyvek Stucco Wrap or equal. Spunbonded high density polyethylene that is textured to provide vertical drainage channels.
   D. Drainage Matt – Dryvit drainage matt for installation over sheathing and code approved water/vapor barrier. Options include:
      (1) Tyvek Stucco Wrap
      (2) Plastic Components Ultra Lath
      (3) Or similar products of approved Manufacturers by Dryvit Systems.

2.6 ADHESIVES
   A. Dryvit AP Adhesive - Manufactures approved adhesive, moisture cure, urethane based adhesive to adhere Dryvit Drainage Strip and Drainage Track.

2.7 FASTENERS
   A. Mechanical Fasteners consist of a 2 in. (51mm) diameter polypropylene washer with key openings for base coat penetration and recessed chamber, used in conjunction with corrosion resistant fastener.
      (1) Washer – shall be Wind-lock, Wind-Devil or Wind-Devil 1, or ITW Buildex Grid-Mate PB and Grid-Master washer.
      (2) Screws – Wood base substrates and light gauge metal (20-26ga) – Min. No. 6 bugle head corrosion resistant screws, drill point. Length to penetrate wood min. ¾", metal 3/8".
      (3) Screws – Steel Framing (12-20ga) – Min. No. 6 bugle head corrosion resistant screws, drill point. Length to penetrate steel framing min. 3/8".
      (4) Brick, Block & Concrete – anchors min. 3/16" (4.8mm) diameter and corrosion resistant. Min. length sufficient to penetrate substrate 1" min. Pullout values shall be substantiated for the particular substrate material and fastener used.
2.8 INSULATION BOARD

A. Nominal 1.0 lb./cu.ft. (16 kg/m3) Expanded Polystyrene (EPS) Insulation Board in compliance with Manufacturers requirements and referenced standards for insulation boards DS131. Specification for Expanded Polystyrene (EPS) Insulation Board.

   (1) Insulation board shall be manufactured by a board supplier listed by Dryvit Systems, Inc.

2.9 BASECOAT

A. Cementitious: a liquid polymer based material, Genesis, or Genesis Dm fiber reinforced base coat Cementitious field mixed with Portland Cement.


C. Noncementitious – Factory ready mixed, fully formulated, water-based product shall be NCB.

2.10 REINFORCING MESSES

A. Mesh Requirements as specified below.

   (1) Mesh – Balanced open weave glass fiber fabric treated for compatibility with other systems materials. Reinforcing Meshes are classified by impact resistance and specified by weight h referenced in Section 1.5C. herein and as specified and provided by Dryvit Systems, Inc. only.

   (2) Mesh shall be Standard, Standard Plus, Intermediate, Panzer 15, Panzer 20, Detail and Corner Mesh as required below.

   (a) Intermediate - for areas at 8 ft. height to 16ft. height above grade or floor elevation at grade (unless noted or specified otherwise).

   (b) Detail and Corner mesh - per manufacturers specifications and requirements for system installation.

2.11 PRIMERS, COATINGS, & SEALERS

A. Contractor shall utilize applicable primer, coating and sealer as required and applicable and or specified herein.

   (1) Demandit
   (2) HDP Paint
   (3) Weatherlastic
   (4) SmoothTuscan Glaze
   (5) Revyvit
   (6) Color Prime
   (7) Prymit
   (8) SealClear

2.12 FINISH COAT

A. Dryvit Medallion Series PMR (Proven Mildew Resistance) - water based, acrylic finish with integral color and texture and formulated with DPR chemistry per manufacturer.

   (1) Sandpebble PMR – pebble texture

2.13 COLOR

A. Color selections shall be made from the Manufacturers full line of standard colors.
2.14 JOB MIXED INGREDIENTS

A. Portland Cement: ASTM C-150, Type I.
B. Water: Clean and potable.

3. EXECUTION

3.1 ACCEPTABLE INSTALLERS

A. Pre-qualify under Quality Assurance requirements of this specification (Section 1.7, B).
B. EIFS System specified herein Dryvit Outsulation, LCMD-3 except as modified herein. See Reinforcing Mesh specifications.

3.2 DESIGN REQUIREMENTS

A. The Manufacturers Published specifications covering Design Requirements for the System specified shall be met in their entirety without limitation or exception.

(1) Acceptable substrates for the Outsulation LCMD System shall be:
   (a) Exterior grade gypsum sheathing meeting ASTM C 1396 (formerly C 79) requirements for water resistant core or Type X core at the time of application of the Outsulation LCMD System.

(2) Deflection of substrate systems shall not exceed 1/240 times the span.
   (a) The substrate shall be flat within 1/4 in (6.4 mm) in a 4 ft (1.2 m) radius.
   (b) The slope of inclined surfaces shall not be less than 6:12. The length of inclined surfaces shall not exceed 12 in (305 mm).
   (c) All areas requiring an impact resistance classification higher than "standard", as defined by ASTM E 2486 (formerly EIMA Standard 101.86), shall be as detailed in the drawings and described in the contract documents. Refer to Section 2.10.A.2 of this specification.

(3) Expansion joints:
   (a) Design and location of expansion joints in the Outsulation LCMD Systems 1-5 is the responsibility of the project designer and shall be noted on the project drawings. As a minimum, expansion joints shall be placed at the following locations:
      1) Where expansion joints occur in the substrate system.
      2) Where the Outsulation LCMD Systems 1-5 abuts dissimilar materials.
      3) Where the substrate type changes.

(4) Terminations
   (a) Prior to applying the Dryvit Outsulation LCMD Systems 1-5, wall openings shall be treated with Dryvit Flashing Tape. Refer to Dryvit Outsulation LCMD Systems 1-5 Installation Details, DS170.
   (b) The Outsulation LCMD Systems 1-5 shall be held back from adjoining materials around openings and penetrations such as windows, doors and mechanical equipment a minimum of 3/4 in (19 mm) for sealant application. See Dryvit’s Outsulation LCMD Systems 1-5 Installation Details, DS170.
   (c) The systems shall be terminated a minimum of 8 in (203 mm) above finished grade.
   (d) Sealants
      1) Shall be manufactured and supplied by others
      2) Shall be compatible with the Outsulation LCMD Systems 1-5 materials. Refer to current Dryvit publication DS153 for a listing of sealants tested by sealant manufacturer for compatibility.
      3) The sealant backer rod shall be closed cell.
(5) Vapor Retarders – The use and location of vapor retarders within a wall assembly is the responsibility of the project designer and shall comply with local building code requirements. The type and location shall be noted on the project drawings and specifications. Vapor retarders may be inappropriate in certain climates and can result in condensation within the wall assembly. Refer to Dryvit Publication DS159 for additional information.

(6) Dark Colors - The use of dark colors must be considered in relation to wall surface temperature as a function of local climatic conditions. Use of dark colors in high temperature climates can affect the performance of the system.

(7) Flashing: Shall be provided at all roof-wall intersections, windows, doors, chimneys, decks, balconies, and other areas as necessary to prevent water from entering behind the Outsulation LCMD Systems 1-5.

3.2 EXAMINATION

A. Inspect surfaces for:

(1) Dryvit Systems, Inc. Design Requirements shall be met per the installer’s field inspection prior to bidding and commencing the work. ALL substrate materials and conditions and requirements shall be acceptable and per manufacturers requirements without limitations. The Contractor shall notify the Architect if ANY condition(s), details and/or specifications are not compliant with manufacturers substrate requirements prior to commencing work.

(2) Only manufacturer’s acceptable substrate materials shall be allowed as part of an approved EIFS system. The contractor shall notify the architect of any substrate material that may be encountered that is not acceptable.

(3) Contamination - Algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.

(4) Surface absorption and chalkiness.

(5) Cracks - Measure crack width and record location of cracks.

(6) Damage and deterioration.

(7) Moisture content and moisture damage - Use a moisture meter to determine if the surface is dry enough to receive the EIFS and record any areas of moisture damage.

(8) Compliance with specification tolerances - Record areas that are out of tolerance (greater than ¼” in 4'-0” radius.

B. Report deviations from the requirements of project specifications or other CONDITIONS that might adversely affect the EIFS installation to the general contractor.

3.3 SURFACE PREPARATION

A. Remove surface contaminants (refer to ASTM D-4258 and D-4261).

B. Apply conditioner by sprayer or roller to chalking or excessively absorptive surfaces.

C. Replace weather damaged sheathing and repair damaged or cracked surfaces.

D. Level surfaces to comply with required tolerances.

E. Protect adjacent work and finishes as required.

3.4 INSTALLATION

A. Prior to the installation of the Outsulation LCMD Systems 1-5, the architect or general contractor shall ensure that all needed flashings and other waterproofing details have been completed, if such completion is required prior to the Outsulation LCMD Systems 1-5 application. Additionally the contractor shall ensure that:

A. Metal roof flashing has been installed in accordance with the manufacturer’s requirements, Asphalt Roofing Manufacturers Association (ARMA) Standards and Dryvit Outsulation LCMD Systems 1-5 Installation Details, DS170, or as otherwise necessary to maintain a watertight envelope.

B. Openings are flashed in accordance with the Outsulation LCMD Systems 1-5 Installation Details, DS170, or as otherwise necessary to prevent water penetration.

C. Flues, Chimneys, balconies, decks, etc. have been properly flashed.
D. Windows, doors, etc. are installed and flashed per manufacturer's requirements and the Outsulation LCMD Systems 1-5 Installation Details, DS170.

E. Sheet type membrane water-resistive barriers have been installed in a weatherboard fashion in accordance with building code and manufacturer's requirements.

3.5 SYSTEM SPECIFIED & INSTALLATION

Install Class PB EIFS in compliance with manufacturer’s published instructions. The specified Dryvit System shall be LCMD System 3.

A. All requirements of the manufacturer's specifications shall be applicable to the system installation, except where higher specifications requirements herein are referenced.

B. Manufacturers Application Instructions DS172 shall be utilized.

C. Overall minimum base coat thickness shall be sufficient to fully embed the mesh. Apply with the base coat in two (2) passes.

D. Sealant shall not be applied directly to textured finishes or base coat surfaces. LCMD 1-5 surfaces in contact with sealant shall be coated with Demandit or Color Prime.

(1) Backwrapping – backwrap per manufactures’ specifications.

(2) Mechanical Fastening and Adhesive Application and Installation of Insulation Board per manufacturer's instructions.

   (a) Butt all board joints tightly together to eliminate any thermal breaks in the EIFS. Care must be taken to prevent any adhesive from getting between the joints of the boards.

   (b) Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of openings.

(3) Slivering and Rasping of Insulation Board Surface

   (a) Fill any open joints in the insulation board layer with slivers of insulation or approved spray foam.

   (b) After insulation boards are firmly adhered to the substrate, rasp the surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.

   NOTE: EPS insulation board exposed to sunlight will develop a powdery residue on the surface. This film must be entirely removed by rasping the surface.

(4) Reveals/Aesthetic Grooves

   (a) Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on project plans.

   (b) Offset reveals minimum 3” (75 mm) from insulation board joints.

   (c) Do not locate reveals at high stress areas such as corners of windows, doors, etc.

   (d) A minimum of ¾” (19 mm) thickness of insulation board must remain at the bottom of the groove after cutting.

(5) Completion of Backwrapping – per manufacturer’s instructions.

(6) Base Coat and Reinforcing Mesh Application

   (a) Apply all mesh, detailing, corners, etc. per manufacturer's instructions and specifications.

   (b) Embed strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.

   (c) Apply detail mesh at reveals. Embed the mesh in the wet base coat and trowel from the base of the reveal to the edges of the mesh.

   (d) High impact mesh application (required at all ground floors and other areas of abnormal stress or impact as indicated on drawings).
(7) Finish Coat Application

(a) NOTE: If a primer is used, apply with brush, roller or proper spray equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.
(b) Apply finish directly over the base coat (or primer base coat) ONLY AFTER THE BASE COAT/PRIMER HAS THOROUGHLY DRIED per the Manufacturers Installation Instructions. Follow these general rules for application of finish:

1) Avoid application in direct sunlight.
2) Apply finish in a continuous application, and work to a wet edge.
3) Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying and may require adjustments in scheduling of work to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
4) Do not install separate batches of finish side-by-side.
5) Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
6) Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

3.6 PROTECTION

A. Provide protection of installed EIFS materials from water infiltration into or behind the system.
B. Provide protection of installed EIFS from dust, dirt, precipitation, freezing and continuous high humidity until EIFS coatings are fully dry.

3.7 CLEANING

A. Remove any stains or recoat finish as required if damaged during construction prior to acceptance.
B. All excess materials, tools and equipment shall be removed from the site.
C. Remove all debris, foreign substances resulting from this work from the work area.

END OF SECTION 07240
1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, accessories, equipment and services necessary to fabricate, install and complete the sheet metal work described in the Contract Documents.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01035 - Alteration Work Procedures.
   (3) Section 02050 - Demolition.
   (4) Section 03100 - Concrete and Cement Work.
   (5) Section 04200 - Masonry and Mortar Materials.
   (6) Section 05000 - Miscellaneous Metal.
   (7) Section 07900 - Caulking and Sealants.
   (8) Division 15 - Mechanical.
   (9) Division 16 - Electrical.

1.2 SUBMITTALS

A. Submit shop drawings in accordance with the conditions of the Contract.

B. Submit actual color selection samples to the Architect when color selection is required.

1.3 SPECIAL GUARANTEE

A. Work of this Section shall be guaranteed as follows:

   (1) Sheet metal shall be maintained watertight for a period of two (2) years from the date of Substantial Completion as defined in the General Conditions.
   (2) All other sheet metal work shall be guaranteed for a period of one (1) year.
   (3) During the guarantee period the Owner may make temporary emergency repairs required for the protection of the building and contents without invalidating the guarantee.

1.4 QUALIFICATIONS

A. Materials and products referred to herein shall be as specified with no substitutions unless unavailable and specifically approved by the Architect.

B. Products of other manufacturers shall be considered when requested in accordance with the Supplementary Conditions.

1.5 REFERENCE STANDARDS

A. The following published reference standards shall be incorporated into this specification.

   (1) American Society for Testing and Materials (ASTM); Standard Specifications (latest edition), noted throughout this specification.
   (3) Sheet Metal and Air Conditioning Contractors National Association (SMACNA); Sheet Metal Specifications (latest edition).
   (4) American Iron and Steel Institute.
2. PRODUCTS

2.1 MATERIAL

A. Sheet Metal

(1) Pre-Finished Metal (Steel): Shall be ColorKlad as manufactured by Vincent Metals, Building Products Group, consisting of 24 gauge galvanized steel (G-90) with a fluoropolymer coating containing Kynar/Hylar resin. Color(s) to be selected by the Architect.

B. Screws, Clips, Etc.

(1) Unless other materials are indicated or specified, all nails, screws, bolts, rivets and other fastenings for sheet metal shall be Type 302, 304, or 305 stainless steel and of size and type suitable for the intended use.

(2) Unless otherwise indicated or specified, all fastenings shall be concealed. All nails shall be 12 gauge, flat head annual-thread type, and of sufficient length to penetrate backing at least ¾". Space nails on 6" centers unless other spacing is designated.

C. Solder

(1) ASTM B-32 composed of 50% block tin and 50% pig lead; flux shall be that best suited to material being soldered.

D. Elastic Cement

(1) A mixture of asphalt and reinforcing fibers conforming to Federal Specification SS-C-153; Noah's Pitch is acceptable.

E. Sealing Compound

(1) For sealing flashing reglets, single component synthetic rubber base type complying with Federal Specification TT-S-00230. Color of compound shall be as approved to match or blend with adjacent materials. Products of Steelcote, Pecora, Tremco, or Toch are acceptable.

F. Felt

(1) 6 pound rosin-sized or unsaturated, non-asbestos building paper.

G. Accessories

(1) All accessories or other items essential to the completeness of the sheet metal installation, though not specifically shown or specified, shall be provided. All such items, unless otherwise indicated on the drawings or specified, shall be of the same kind of material as the item to which applied and the gauges shall conform to recognized industry standards of sheet metal practice.

2.2 PREFABRICATED ITEMS

A. Metal Panels:

(1) Shall be McElroy Metal Multi-V Panel (36" wide), consisting of 24 gauge galvanized steel. Provide Kynar 500 finish on weather face – custom color as selected by Architect.
B. Soffits

(1) Shall be Posi-Lock Soffit as manufactured by Alumax, 0.032 aluminum alloy, Kynar 500 fluorocarbon coating, color(s) selected by the Architect from the manufacturer's standard line of colors. Twenty-five percent (25%) of the soffit panels shall be provided as vented panels except where indicated on the drawings. Panels shall be continuous without seams in the long direction.

(2) Comparable products by Berridge Manufacturing Company and Petersen Aluminum Corporation are acceptable when meeting or exceeding the requirements of the specified products.

3. EXECUTION

3.1 INSTALLATION - GENERAL

A. Except as otherwise specifically noted, all work shall be installed in accordance with the Architectural Sheet Metal Manual, Latest Edition, published by the Sheet Metal and Air Conditioning Contractors' National Association, Inc. (Ref. SMACNA Manual)

B. Schedule and coordinate sheet metal installation with the work of other trades where it is integral or continuous therewith. Materials furnished under this Section which are to be built-in by other trades shall be delivered to the site in sufficient time to avoid delays to construction progress. Instruct other trades concerning the location and placement of reglets, wood nailers and cleats.

C. Surfaces over which sheet metal is to be applied shall be inspected prior to installation and all defects shall be reported in writing to the Contractor. A copy of such report shall be sent to the Architect.

D. Sheet metal shall be protected against electrolysis. Adjacent dissimilar metal shall be insulated with Teflon tape or heavy bituminous coating to prevent metal-to-metal contact.

E. All work shall be accurately formed by means of proper tools, fastened with lock joints, cleats or other accepted techniques designed to permit expansion and contraction of the metal while assuring the weathertightness of the assembly.

F. Provide expansion joints in sheet metal work at intervals as indicated or specified, but not less than as recommended by SMACNA. Expansion joints shall be fabricated in accordance with applicable details as indicated in the SMACNA Manual.

G. Fabricate and install sheet metal with lines, arises and angles sharp and true and plane surfaces free from objectionable wave, warp, or buckle.

H. Exposed edges of sheet metal shall be folded to form 1/2" wide hem on the side concealed from view.

I. Finished work shall be free from water leakage under all weather conditions.

J. Provide all miscellaneous framing members as required for a complete installation.

3.2 SOLDERING

A. Except where other methods of jointing are indicated or specified, all joints, seams and connections of sheet metal work shall be soldered. All soldering shall be done with sufficient flux and heat to assure proper bond and full joints. Seams shall be reinforced by mechanical locking or riveting and all traces of flux shall be removed immediately after soldering. All seams or joints which cannot be made watertight by soldering shall be loose-locked and filled with elastic cement. Neutralize acid flux, if used.

3.3 CLEATING

A. General: Cleats shall be 2" wide by 3" long and formed of material of the same thickness as the member being fastened. Provide continuous cleats where noted.

B. Secure cleats to masonry or to nailing strips with two (2) nails spaced 3/4" from the end, turn end of cleat back to cover nail heads. Lock other end of cleat into seam or the folded edge of member being fastened.
C. Where seams are to be soldered, roughen and tin the cleats.
D. Use cleats for securing edges of sheet metal members over 12" wide, fascias, eave stops and other locations indicated or specified.
E. Space cleats not more than 12" apart unless other spacings are indicated or specified.

3.4 SHEET METAL CONSTRUCTION

A. Cap, Wall, Base and Miscellaneous Flashing
   (1) Provide metal cap flashing and wall caps at top edges of built-up flashings and at other locations indicated on the drawings.
   (2) Form in 8' lengths, except where shorter pieces are required. Lap end joints a minimum of 3". Do not solder or weld joints.
   (3) Make flashing continuous at angles and corners.
   (4) Flashing shall overlap base materials with a minimum of 6", except where it shall be concealed or is otherwise indicated.
   (5) Bottom edge of flashings shall be folded back ½" on underside.
   (6) Extend flashing into masonry walls not less than 1" and fasten flashing with lead wedges every 12". Fill reglets continuously with sealing compound.
   (7) All cap and wall flashings shall return to horizontal surface at ends of runs.
   (8) Provide miscellaneous flashings of configuration indicated for sills, condensate gutter, etc.

B. Expansion Joint Flashing
   (1) Expansion joints shall be formed to shapes as detailed, complete with covers as required.
   (2) Form units in lengths not to exceed 10'-0" and run continuous the full length of the expansion joint.
   (3) Expansion joint in masonry wall shall be "V" type as detailed.
   (4) Note: Contractor has the option of using a comparable plastic flashing for this detail.

C. Downspouts
   (1) Downspouts shall be of sizes and design noted on the drawings.
   (2) End joints shall be lapped not less than 1½" in direction of flow and soldered.
   (3) At top of each spout, provide tinned wire strainers of stock design.
   (4) Turn downspouts out onto splash blocks at bottom.
   (5) Secure downspouts to wall with double thick rolled edge straps, maximum 8'-0" on centers. Secure to wall with expansion shields and bolts at masonry joints, and metal screws matching panels at insulated panels.

D. Gutters
   (1) Furnish and install gutters as detailed and where located on drawings.
   (2) Extend 4" minimum onto roof. Extend further if required to get secure anchorage on wood blocking.
   (3) Front edge shall be reinforced with folded in edge of gutter.
   (4) Roof braces spaced 3'-0" on center shall be bolted to front edge of gutter and countersunk screwed to roof.

3.5 PREFABRICATED ITEMS

A. Soffits
   (1) Prefabricated soffit shall be installed according to the manufacturer's specifications and as detailed on the drawings.
B. Expansion Joint Flashing
   
   (1) Expansion joints shall be flashed according to the manufacturer’s specifications and as detailed on the drawings.

3.6 EXISTING WORK

A. All cutting, patching and relocation of existing sheet metal to accommodate new work shall be included as part of this Section.
B. All new materials shall be used unless specifically noted.
C. Design of all items shall match existing.

3.7 CLEANING

A. All sheet metal work shall be thoroughly cleaned of all dirt on completion. Repair or replace all marred areas as directed by the Architect.

END OF SECTION 07600
1. GENERAL

1.1 SCOPE

A. Furnish all labor, material, services and equipment necessary to fabricate and install the metal roofing, gutters, downspouts and trim systems as shown on the drawings and specified herein.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01100 - Reserved Items.
   (3) Section 04200 - Masonry and Mortar Materials.
   (4) Section 05000 - Miscellaneous Metal.
   (5) Section 06100 - Carpentry.
   (6) Section 07600 - Sheet Metal.
   (7) Section 07900 - Caulking and Sealants.
   (8) Section 09250 - Gypsum Wallboard (Drywall).
   (9) Section 09900 - Painting and Finishing.

1.2 SUBMITTALS

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract. Shop drawings shall detail fabrication and erection indicating profile and gauge of all components, fasteners, trim, angles, sealants and other details as necessary to erect a weathertight assembly.

B. Shop drawings shall also include a detailed layout plan showing the size and location of all trim shapes and expansion joints.

C. Submit actual standard color samples of all materials to the Architect for color selection.

D. Provide a 5'-0" x 5'-0" sample panel showing typical details that are required on this project.

E. Engineered Design Calculations:
   (1) Submit panel system manufacturer's design calculations verifying the panel system meets the design criteria specified.
   (2) Design calculations shall be sealed by a professional Structural Engineer employed by the manufacturer of panel system and licensed to practice in the jurisdiction where the project is located.

F. Certification:
   (1) Submit manufacturer’s certification that materials and finishes meet specified requirements for air infiltration, water penetration, thermal movement, and structural performance.
   (2) Submit written verification of Panel Applicator's factory installation training performed by the architectural standing seem metal roofing system manufacturer and a copy of the Panel Applicator’s “Authorized Applicator” certification.

G. Maintenance Data: For metal roof panels to include in maintenance manuals.

H. Warranties: Special warranties specified in this Section.

1.3 WARRANTY

A. All finishes shall be warranted for a minimum of twenty (20) years, from the date of Substantial Completion, against fade, peeling and chalking.

B. The roofing subcontractor shall furnish to the Owner the manufacturer’s standard twenty (20) year guarantee of watertightness covering both labor and material. The guarantee shall be fully paid for by the roofing subcontractor. The guarantee shall start on the date of Substantial Completion as defined in the Conditions of the Contract.
C. The Contractor shall notify the Architect in writing, prior to starting work, of any conditions or details which will prevent the system's acceptance by the manufacturer for subsequent issuance of these guarantees.

D. All guarantees specified shall be issued to the Owner by the roofing system manufacturer regardless of any disputes that the roofing contractor may have with the Owner concerning payment, job performance, quality of work, or any other conflicts which may occur.

E. All guarantees specified shall be issued to the Owner by the roofing system manufacturer regardless of any disputes that the manufacturer may have with the roofing contractor concerning payment, job performance, quality of work, or any other conflict which may occur.

F. Manufacturer shall certify in writing that the entire installation satisfies the requirements of UL90 uplift rating.

G. The Contractor and Subcontractor shall issue a letter to the Owner certifying that their installation process is approved by the metal roof manufacturer for issuance of the warranty.

H. This Contractor is to include a manufacturer's employed field technical representative, for final roof inspection.

1.4 QUALIFICATIONS

A. Products specified herein refer to the products of Atas International, Inc., Allentown, PA.

B. Comparable products of the following manufacturers are acceptable when meeting or exceeding the requirements of the specified products:

(1) Petersen aluminum Corp. "SNAP-CLAD" (16" w. x 1¾" h.).
(2) Firestone Metal Products. "UNA-CLAD" (14" w. x 1½" h.).
(3) AEMP-SPAN. "HIGH SEAM" (16" w. x 1½" h.).
(4) Berridge Manufacturing Corporation. "CEE LOCK" (16½" w. x 1½" h.).
(5) Centria Architectural Systems. SDP 175 (16" w. x 1¾" h.).
(6) McElroy Metals, Inc. "MEDALLION LOK" (16" w. x 1¾" h.).
(7) Dimensional Metals, Inc. (DMI), Span-Lock SL 2016 (16" w. x 2" h.).

C. Products of other manufacturers will be considered when requested in accordance with the conditions of the Contract and when accompanied by product specifications and actual color samples.

D. Roofing and flashing shall be applied only by factory trained and approved roofing subcontractors familiar with the product and in strict compliance with the manufacturer's published specifications and instructions, which shall govern final installation as required to obtain full compliance with manufacturer's full and complete guarantee.

1.5 SYSTEM DESCRIPTION

A. Design Requirements:

(1) The architectural standing seam metal roof system, including: panels, flashings, attachment clips, and attachment screws shall be designed by the standing seam metal roof system manufacturer to meet the local building code as defined by the design professional. The applicable building code is: IBC 2015. The design criteria shall include the following:

(a) Listing of applicable loads.
(b) Listing of the building importance factor (life safety factor).
(c) Design wind speed.
(d) Building exposure factor.
(e) Other necessary criteria.
(2) The architectural standing seam metal roof manufacturer shall provide an engineered analysis of the roofing system assembly, sealed by a registered professional engineer employed by the manufacturer, verifying that the product and attachment methods will resist wind pressures imposed upon it pursuant to the applicable building codes and that the standing seam metal roof system fully complies with all specified requirements.

(3) The architectural standing seam metal roof system shall bear fully documented proof that it has been independent laboratory evaluated using the US Army Corps of Engineers Guide Specification (CEGS) 07416.

(a) “Proof” shall be defined as both the manufacturer and the product being included in the document entitled, “List of Approved Standing Seam Metal Roof Systems” as published by the IS Corps of Engineers.

(4) Provide UL 90 rated roofing panels that have been tested in accordance with UL 580 protocol.

(5) Provide factory preformed architectural standing seam metal roofing system that has been pretested and certified by the manufacturer to comply with specified requirements under installed conditions.

(6) Provide one-piece, single length roof panels without need for interior laps or splices.

(7) Provide continuously interlocking architectural standing seam metal roofing panels that inherently increases load span capability, stiffness and flexural stress handling capacity.

(8) Provide architectural standing seam metal roof panel capable of spanning 3'-0" spacing and maintaining UL 90 wind uplift rating.

(9) Provide continuous factory installed hot melt butyl sealant within the confines of the architectural standing seam metal roofing panel female rib. Loose gaskets and field applied panel sealants are unacceptable.

(10) Provide factory preformed architectural standing seam roof panels that have been tested and approved for a Class 4 Impact (hail) resistance rating per UL 2218. Listing shall be present on the Underwriters Laboratories website.

(11) Onsite mechanically seamed or field rollformed panels are not acceptable.

B. Thermal Movement: Provide metal roof panel assemblies that allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperature of materials due to both solar heat gain and nighttime sky heat loss. Exposed fasteners in roofing panels are not permitted.

(1) Temperature Change (range): 120° F, ambient; 180° F at material surfaces.

C. Structural Requirements:

(1) Panel structural properties determined in accordance with latest edition of American Iron and Steel Institute’s “Cold Formed Steel Design Manual” using “effective width” concepts.

(2) Wind uplift design for roof assemblies shall be calculated by the architectural standing seam metal roof system manufacturer per ASTM E-1592. Calculations shall include establishment of ultimate and allowable roof system uplift capacities for both the “field” and “areas of discontinuity”.

(3) Provide confirmation of positive and negative buckling movements and uplift capacity determined by full scale testing.

1.6 QUALITY ASSURANCE

A. Panel Applicator Qualifications:

(1) Panel Applicator must have a minimum of five (5) years experience in the successful
application of architectural structural batten standing seam metal roofing systems.

(2) Panel Applicator must be factory trained and authorized by the architectural standing seam metal roofing system manufacturer prior to the bid date in order to obtain a contractor for installation.

(3) Use adequate members of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.

(4) Use equipment of adequate size, capacity and numbers to accomplish the work of this section in a timely manner.

(5) Upon request, submit a minimum of five (5) successfully completed projects of similar size and scope. List project address, date of installation with Architect and Owner names and telephone numbers.

B. Manufacturer's Qualifications:

(1) Minimum twenty (20) years experience in the fabrication of architectural standing seam metal roofing systems on projects of similar size and scope. Upon request, submit a minimum of five (5) project references for Architect's review. List project address, date of installation with Architect and Owners names and telephone numbers.

(2) Products listed in this specification are as manufactured by AEP Span.

(3) No other manufacturer of architectural standing seam metal roofing systems will be accepted without prior written approval of the Architect based upon the manufacturer verifying the products can meet or exceed all specified performance criteria listed in these specifications.

(4) Requests to be listed as an approved manufacturer must be submitted in writing a minimum of fifteen (15) days prior to bid date and be accompanied by product literature, technical information, sealed Engineer’s calculations verifying conformance and a product sample. Approved manufacturers will only be set forth in written and issued addendum.

(5) No substitutions will be permitted after the bid date.

C. Professional Engineer Qualifications

(1) Professional Structural Engineer employed by the architectural standing seam metal roof manufacturer, who is legally qualified and licensed to practice in the jurisdiction where the project is located.

D. Single Source Responsibility: Provide all items of architectural standing seam metal roofing system work specified herein by a single roofing contractor to provide undivided responsibility.

E. Surface-Burning Characteristics: Polyisocyanurate rigid insulation under the architectural structural batten standing seam metal roofing systems shall have the following surface-burning characteristics as determined by testing identical products per ASTM E-84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

(1) Flame-Spread Index: 25 or less unless otherwise indicated.

(2) Smoke-Developed Index: 450 or less, unless otherwise indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

(1) Delivery of material shall be made only after suitable facilities for its storage and protection are available at the project site.

(2) Protect products and accessories from damage and discoloration during transit and at project site.

(3) Upon receipt of preformed and prefinished architectural standing seam metal roofing panels, flatsheets, flashings and panel accessories. Panel Applicator shall examine each container for damage during transit and completeness of the consignment.
B. Storage:

(1) Store materials out of the weather in a clean dry place. One end of each container should be slightly elevated and covered with a loose weatherproof covering to prevent condensation.

(2) Panels and/or flashings with strippable film must not be stored in areas exposed to direct sunlight.

(3) Care should be taken to prevent contact with any substance that may cause discoloration.

(4) Store materials to provide ventilation and prevent bending, abrasion or twisting.

(5) Do not overload roof structure with stored materials. Do not permit material storage or foot traffic on completed roof surfaces.

C. Handling:

(1) Care should be taken to avoid gouging, scratching, or denting.

(2) Do not allow foot traffic on completed roof. If required, provide cushioned walk boards.

(3) Protect installed products from damage caused by foreign objects and other trades until completion of the project.

(4) Comply with pertinent provisions of Supplementary Conditions.

2. PRODUCTS

2.1 STANDING SEAM METAL ROOFING

A. Panels shall be Monarch roof panels.

(1) 24 gauge galvanized steel.

(2) Panel Style: Dutch Seam.

(3) Width 15” inches: MRD 150.

(4) Panel Depth: 1½ inches.

(5) Without Stiffening Ribs.

(6) Panel Length: Continuous eave to ridge.

(7) Texture: Stucco Embossed.

(8) Color: Custom color as selected by Architect.

B. Panels shall be supplied in continuous lengths.

C. Standing seam cover shall contain an extruded vinyl weather seal insert.

D. Fasteners shall be non-penetrating clips made of galvanized steel.

E. Finish shall be Kynar 500 applied over a prime coat. Finish shall be warranted as required by Section 1.3, A.

F. Provide all trim shapes (pitch break, eave, sill, rake wall, corners, etc.) as required to complete the installation. Trim shapes shall be 24 gauge galvanized steel finished to match the panels.

2.2 GUTTERS AND DOWNSPOUTS

A. Gutters and downspouts shall be 24 gauge, galvanized steel, finished the same as for the roofing panels.

B. Color of gutters and downspouts shall match the roofing panels.

2.3 ICE & SNOW DAM

A. Ice/Snow dam shall be the "S-5" System as manufactured by LMC Curbs, Longview, Texas. Provide a complete assembly including S-5A(E) clamps, S-5 SnoRod with couplings, SnoPost (E), SnoClips and other miscellaneous accessories required to complete the installation. All components shall be provided in a mill finish.
2.4 ICE AND WATER SHIELD

A. Membrane shall be one of the following and as recommended by the manufacturer.
   
   (1) “Ice and water shield” rubberized asphalt membrane as manufactured by W. R. Grace & Co.
   
   (2) “Self adhering” TW underlayment as manufactured by Tamko Waterproofing.

2.5 ACCESSORIES

A. Building Felt
   
   (1) Refer to Section 06100, Carpentry, for building paper (felt).

3. EXECUTION

3.1 GENERAL

A. Thoroughly examine all areas of work prior to starting work and report any deficiencies to the General Contractor and Architect. Commencing work implies acceptance of the conditions.

B. All work of this section shall be performed in strict accordance with the manufacturers requirements and these specifications.

3.2 INSTALLATION OF STANDING SEAM METAL ROOFING

A. Install one layer of 30 pound roofing felt over the substrate and overlap joints a minimum of six inches (6”). Secure felt to substrate with galvanized roofing nails or staples.

B. Install ice and water shield as required by the roofing manufacturer as shown on their shop drawings to secure their warranty. If ice and water shield is required over the entire roof area, roofing felt may be omitted with the approval of the roofing manufacturer.

C. Install standing seam metal roofing and all required trim shapes according to the requirements of the manufacturer and the Contract Documents.

D. Install expansion joints where required by the manufacturer to allow for thermal movement, and as shown on drawings. Review expansion joint locations with the Architect prior to installation.

E. Protect panels from contact with dissimilar metals.

F. All penetrations thru the metal roof panels or wall panels shall be by the certified metal roof/wall panel manufacturer/installer. This includes cutting, adjustment, flashing, boots, collars, etc. for all utility trade penetrations.

G. Roofing and flashing shall be applied only by factory trained and approved roofing subcontractors familiar with the product and in strict compliance with the manufacturer’s published specifications and instructions, which shall govern final installation as required to obtain full compliance with manufacturer’s full and complete guarantee.

H. All flashings and terminations shall be done in accordance with manufacturer’s details. No other trade shall make any penetrations and/or flashing terminations thru the wall/roof panels. All penetrations and flashings shall be installed by the certified metal roof/wall panel installer.

3.3 INSTALLATION OF GUTTERS AND DOWNSPOUTS

A. Downspouts and gutters shall be the size and shapes as indicated on the drawings.

B. End joints shall be lapped a minimum of 1½ inches in the direction of flow and shall be sealed.

C. Extend gutter onto roof as detailed on the drawings.

D. Front edge of gutters shall be reinforced with a ⅛” x 1” bar.

E. At the top of each downspout provide a tinned wire strainer.

F. Run downspouts into downspout shoes or turn out onto metal splash pans at lower roof.
G. Secure downspouts to walls with 1/16” x 3” straps at a maximum of 10’-0” on center, (two (2) straps minimum). Secure to wall with lead expansion shields and bolts at masonry locations.

H. Provide expansion joints where required to allow for thermal movement.

3.4 CLEAN-UP

A. Remove from the site all debris that is a result of this work.

B. Upon completion all metal panels and trim shall be free from damage, defects, scratches and discolorations. Replace all damaged components to the satisfaction of the Architect.

C. Upon completion the completed assembly shall be weathertight.

END OF SECTION 07610
1. GENERAL

1.1 SCOPE

A. Provide all material, labor, equipment, services and accessories necessary to complete the construction firestopping specified herein. This Section shall include, but not be limited to, the following:

(1) Through penetration firestopping, in fire-rated construction, of mechanical, plumbing and electrical materials and equipment.
(2) Construction-gap firestopping occurring within fire-rated walls, floors or floor-ceiling assemblies.
(3) Construction-gap firestopping at connections of the same or different materials in fire-rated construction.
(4) Construction-gap firestopping occurring at the top of fire-rated walls and partitions.
(5) Refer to floor and ceiling plans, wall types, sections, details and specifications to determine required locations as well as assemblies referenced in the documents by all disciplines and trades performing work.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01035 - Alteration Work Procedures.
(3) Section 02050 - Demolition.
(4) Section 03100 - Concrete and Cement Work.
(5) Section 04200 - Masonry and Mortar Materials.
(6) Section 05000 - Miscellaneous Metal.
(7) Section 06100 - Carpentry.
(8) Section 07900 - Caulking and Sealants.
(9) Section 08100 - Metal Doors and Frames.
(10) Section 09250 - Gypsum Wallboard (Drywall).
(11) Section 09900 - Painting and Finishing.
(12) Division 15 - Mechanical.
(13) Division 16 - Electrical.

1.2 SUBMITTALS

A. Submit manufacturer's product information in accordance with the conditions of the Contract.
B. Submit shop drawings detailing all conditions encountered and materials intended to be used to complete the work required by this Section.

1.3 GUARANTEE

A. All firestopping shall be guaranteed by the manufacturer for a period of not less than one (1) year from the date of Substantial Completion.
B. Guarantee shall cover joint adhesion, co-adhesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, general durability and material defect.

1.4 QUALITY ASSURANCE

A. All materials and installations shall be in compliance with the following applicable codes, regulations and industry standards:

1.5 ACCEPTABLE MANUFACTURERS

A. Products specified herein refer to the products of 3M Fire Protection Products.
B. Products of the following manufacturers will also be acceptable when meeting or exceeding the requirements of the specified products:
   
   (1) International Protective Coatings Corporation.
   (2) GE Silicones.
   (3) Hilti Fire Protection Systems.
   (4) Isolatek International.
   (5) Rectorseal Corporation.
   (6) Tremco.
   (7) United States Gypsum.

2. PRODUCTS

2.1 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

A. Systems or devices listed in the U.L. Fire-Resistance Directory under categories XHCR and XHEZ may be used, provided that it conforms to the construction type, penetration type, annular space requirements and fire-rating involved in each separate instance, and that the system be symmetrical for wall applications.
B. Systems and devices must be free of asbestos containing materials.
C. Systems must be capable of withstanding the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as part of the U.L. system or device, and designed to perform the function intended.
D. All firestopping products must be from a single manufacturer.

2.2 CONSTRUCTION-GAP FIRESTOPPING OF FIRE-RATED CONSTRUCTION

A. Firestopping at construction gaps between edges of floor slabs and exterior wall construction.
B. Firestopping at construction gaps between tops of partitions and the underside of structural systems.
C. Firestopping at construction gaps between tops of partitions and underside of ceiling or ceiling assemblies.
D. Firestopping of control joints in fire-rated masonry partitions.
E. Firestopping at expansion joints.
F. Systems listed in the U.L. Fire-Resistance Directory for the application required will be acceptable when conforming to the requirements of the fire-rating required and the conditions encountered.

2.3 ACCESSORIES

A. Provide all fill, void and cavity material required. Material must comply with U.L. Fire-Resistance Directory, classified under category XHHW.
B. Provide all forming accessories as required. Material must comply with U.L. Fire-Resistance Directory, classified under category XHKU.

3. EXECUTION

3.1 GENERAL

A. Examine areas and conditions under which this work will be performed. Report any deficiencies to the General Contractor in writing, with a copy to the Architect. Beginning work acknowledges acceptance of conditions. Refer to all plans and specifications including floor and ceiling plans, wall types and details to determine required locations and assemblies as required.
B. Verify that barrier penetrations are properly sized and suitable conditions for the application of materials.
C. Clean all surfaces to be in contact with penetration sealing materials of dust, dirt, grease, oil, loose materials, rust or other materials that may affect proper fitting, adhesion or the required fire-resistance rating.

3.2 INSTALLATION

A. Install penetration seal materials in accordance with printed instructions of the U.L. Fire-Resistance Directory and in accordance with the manufacturer’s instructions.
B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.
C. Where floor openings without penetrating items are more than four inches in width and subject to traffic or loading, install firestopping materials capable of supporting same loading as the floor.
D. Protect materials from damage on surfaces subject to traffic.
E. Place firestopping in annular space around fire dampers before installation of damper’s anchor flanges which are installed in accordance with fire damper manufacture’s recommendations.
F. Where large openings are created in walls or floors to permit installation of pipes, ducts, cable trays, bus duct or other items, close unused portions of opening with firestopping material tested for the application.
G. Install specified firestopping at locations requiring smoke stopping.
H. Where rated walls are constructed with horizontally continuous air space, double width masonry or double stud frame construction, provide vertical, twelve inch (12") wide fiber dams for full thickness and height of air cavity at a maximum interval of fifteen feet (15'-0").

3.3 FIELD QUALITY CONTROL

A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.
B. Keep areas of work accessible until inspection by the applicable code authorities.
C. Perform under this Section, all patching and repairing of firestopping caused by cutting or penetration by other trades.

3.4 ADJUSTING AND CLEANING

A. Clean up spills of all liquid components immediately. Repair all damage resulting from spilled material.
B. Neatly cut and trim materials as required.
C. Remove equipment, materials and debris, leaving the areas in undamaged, clean condition.
D. Dispose of all excess material and debris that is a result of this Section.

END OF SECTION 07840
1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, equipment and accessories necessary to complete the caulking and sealant work described in the Contract Documents.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01035 - Alteration Work Procedures.
   (3) Section 02050 - Demolition.
   (4) Section 03100 - Concrete and Cement Work.
   (5) Section 04200 - Masonry and Mortar Materials.
   (6) Section 06100 - Carpentry.
   (7) Section 06200 - Millwork.
   (8) Section 07600 - Sheet Metal.
   (9) Section 07840 - Firestopping.
   (10) Section 08100 - Metal Frames and Doors.
   (11) Section 08400 - Aluminum Entrance Work.
   (12) Section 08500 - Metal Windows.
   (13) Section 08800 - Glass and Glazing.
   (14) Section 09250 - Gypsum Wallboard (Drywall).
   (15) Section 09900 - Painting and Finishing.

1.2 SUBMITTALS

A. Submit product specifications in accordance with the conditions of the Contract.
B. Submit full line of standard color samples for material color selection by the Architect, in accordance with the conditions of the Contract.
C. Provide sample joints on the building where directed by the Architect to aid in final color selection by the Architect.

1.3 SPECIAL GUARANTEE

A. All caulking and sealant work shall be guaranteed for a period of two (2) years from the date of Substantial Completion as defined in the General Conditions.
B. During the guarantee period all caulked and sealed joints shall be maintained watertight. The Owner will be permitted to make temporary emergency repairs to protect building and contents without invalidating the guarantee.

1.4 QUALIFICATIONS

A. Products specified herein refer to products of the Tremco Company Construction Division.
B. Products of the following manufacturers are approved when meeting or exceeding these specifications.

   (1) Thiokol Chemical Corporation.
   (2) Steelcote.
   (3) Pecora Chemical Corporation.
   (4) Sika Chemical Corporation.
C. Products of other manufacturers will be considered when requested in accordance with the conditions of the Contract.
2. PRODUCTS

2.1 CAULKING AND SEALANTS

A. General
   (1) All horizontal joints shall receive primer at expansion and control joints at masonry, concrete, wood, marble, and granite.
   (2) All joints at anodized aluminum shall be cleaned and primed per manufacturer's recommendations.

B. General caulking and sealant for exterior and interior application at expansion and control joints at masonry, concrete, wood, marble, and granite.
   (1) Tremco Dymeric: Multi-component epoxidized polyurethane terpolymer sealant. Class A, Type II, ASTM C-920.
   (2) Tremco 200 Cleaner: Methyl-ethyl-ketone (MEK).
   (3) Tremco Primer #6 as per manufacturer's specifications.

C. General caulking and sealant for exterior and interior application at perimeter caulking of windows, doors, curtain walls, bedding or mullions, panels, frames, expansion and control joints at precast concrete panel joints shall be as follows:
   (1) Tremco Dymonic: One-component modified polyurethane sealant. Class A, Type II, ASTM C-920.
   (2) Tremco 200 Cleaner: Methyl-ethyl-ketone (MEK).
   (3) Tremco Primer #3 as per manufacturer's specifications.
   (4) Tremco Primer #6 as per manufacturer's specifications.

D. General caulking and sealant for interior use at perimeter caulking of windows, doors, curtain walls, bedding or mullions, panels, frames, expansion and control joints at masonry, concrete, wood, marble, and granite, where finishes will be painted over all or part of caulk joints.
   (1) Tremco Tremflex 834: Siliconized acrylic latex sealant, Class A, Type 1, ASTM C-834.
   (2) Cleaner and Primer as per manufacturer’s recommendations.

E. Intermediate butyl rubber sealant for general use.
   (1) Tremco Butyl Sealant: Butyl rubber and polyisobutylene sealant.

F. Minimum movement joints at interior locations of drywall and plaster joints.
   (1) Tremco Acrylic Latex Caulk: Acrylic emulsion compound Type 1.

G. Acoustical joint sealant system at interior locations unexposed drywall and plaster joints.
   (1) Tremco Acoustical Sealant: Synthetic rubber non-drying, non-hardening sealant.

H. Acrylic joint sealant, for caulking and glazing.
   (1) Tremco Mono: One part acrylic terpolymer sealant.
   (2) Tremco 200 Cleaner as per manufacturer's specifications.
2.2 ACCESSORIES

A. Joint Backing
   (1) Bond breaker tape: Shall be 3M Type 470 Tape or 481 Tape.
   (2) Backer Rod: Shall be Dow Chemical Ethafoam closed cell. Polyethylene rod. Size of rod to allow 25% compression when inserted into joint.

B. Primer: Where required, shall be used as recommended by the manufacturer.
C. Solvents and cleaning agents and other accessories: Shall be as recommended by the manufacturer.

3. EXECUTION

3.1 FABRICATION

A. All products shall be manufactured in strict accordance with the manufacturer's specifications.
B. Multi-component mixing shall be in strict accordance with the manufacturer's specifications.

3.2 GENERAL

A. Apply materials in conformance with the manufacturer's written directions.
B. Examine all other work and surfaces to receive the work of this Section and report to the General Contractor all conditions not acceptable. A copy of such notice shall be sent to the Architect.
C. Apply sealant under pressure with hand or power actuated gun or other appropriate means. The gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints. All joint surfaces shall be neatly pointed or tooled to provide the proper contour.
D. Work shall not be done when air temperature is below 40° F.

3.3 PREPARATION

A. All joints shall be as indicated on the drawings. Do not seal joints until they are in compliance with drawings and manufacturer's recommendations.
B. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. The sealant shall be applied to the base surface.
C. Porous materials shall be cleaned where necessary by grinding, blast cleaning, mechanical abrading, acid washing or combination of these methods as required to provide a clean, sound base surface for adhesion.
D. Concrete shall be fully cured and free of laitance, loose aggregate, form release agents, curing compounds, water repellents, and other surface treatments. If surface treatments are present, test for adhesion before proceeding with sealant work.
E. Joints shall be a minimum of ¼" wide by ¼" deep, unless otherwise indicated. Depth of the sealant shall be equal to the width in joints up to ½" wide. For joints ½" to 1" wide, depth shall be ½"; greater than 1", comply with sealant manufacturer's recommendations.

3.4 APPLICATION

A. Apply full joint of material at all interior and exterior perimeter joints of all door and window frames, expansion joints, louvers, grilles and other frames at juncture with masonry, concrete, stone, metal and wood reveals. Fill joints wherever "sealant", "caulk" and "caulking" is noted and where required to provide neat appearing and weathertight construction.
B. Install joint filler at proper depth in joint. Sealant and caulking shall not be applied without back-up material, and if required by manufacturer, bond breaker strip.
C. Apply masking tape, where required, in continuous strips in alignment with joint edge. Remove tape immediately after joints have been filled and tooled.
D. Prime surfaces with primer as recommended by the manufacturer.
E. Fill joints solidly and smoothly without thin edges.
F. Surface of caulking shall be smooth and even, without laps, sags, or thin spots.
G. Complete all work before any paint is applied.
H. Clean adjacent surfaces free of soiling resulting from this work as work progresses. Use solvent or cleaning agent as recommended by the manufacturer. All finished work shall be left in a neat, clean condition.

END OF SECTION 07900
SECTION 08100 - METAL FRAMES AND DOORS

1. GENERAL

1.1 SCOPE

A. Fabricate and deliver, for installation by masons or carpenters, all metal doors and metal frames. This section includes side light frames, both attached and not attached to door frames, and independent fixed window frames fabricated from door frame stock as detailed.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01035 - Alteration Work Procedures.
(3) Section 02050 - Demolition.
(4) Section 03100 - Concrete and Cement Work.
(5) Section 04200 - Masonry and Mortar Materials.
(6) Section 05000 - Miscellaneous Metal.
(7) Section 05100 - Structural Steel.
(8) Section 06100 - Carpentry.
(9) Section 06200 - Millwork.
(10) Section 07900 - Caulking and Sealants.
(11) Section 08200 - Wood Doors.
(12) Section 08400 - Aluminum Entrance.
(13) Section 08500 - Metal Windows.
(14) Section 08700 - Finish Hardware.
(15) Section 08800 - Glass and Glazing.
(16) Section 09250 - Gypsum Wallboard (Drywall).
(17) Section 09900 - Painting and Finishing.

1.2 SHOP DRAWINGS

A. Submit shop drawings in accordance with the conditions of the Contract.

B. Drawings and schedules must include: Manufacturer, sizes, gauges, types, swing, hardware location, and reinforcing.

1.3 QUALIFICATIONS

A. Doors and frames shall meet or exceed these specifications and shall be products of the following manufacturers:

(1) Ceco.
(2) Mesker.
(3) Steelcraft.
(4) Amweld.
(5) Kewanee.
(6) Phillip Manufacturing Company.
(7) Fenestra.
(8) Republic.
(9) Curries.
(10) ELCO Manufacturing.

B. Products of other manufacturers will be considered when requested in accordance with the conditions of the Contract. Requests must include proof of U.L. assembly rating compliance.
2. PRODUCTS

2.1 METAL FRAMES

A. All metal frames shall have these characteristics:

(1) **Stock material:** 16 gauge, cold-rolled steel for frames 3’-5” and less in width. 14 gauge, cold-rolled steel for frames 3’-6” and wider in width.

(2) **Corners:** Mitered, set-up, welded, and ground flush. Ship fully assembled with floor spreaders.

(3) **Hardware preparation:** Mortise hinge side, reinforce all scheduled hardware locations with 8 gauge steel sheet minimum at hinges, 16 gauge at locksets and 14 gauge for closers. Drill and tap reinforcement for hinge screws. Provide plaster guards at strike and hinge locations.

(4) **Anchors:** Provide at least two floor anchors and six jamb anchors suitable for the wall type indicated for each frame.

(5) **Mutes:** Install three rubber mutes (bumpers) on each strike jamb; two on each double door frame head.

(6) **Finish:** Bonderize and paint one coat of baked-on rust-inhibitive primer.

(7) **Fire-rating:** Provide frames with the U.L. label required for the door scheduled to go into the frame.

(8) **Glazing stops:** Provide 18 gauge steel stops for all sidelights and independent fixed window frames. All exterior stops to be set in clear silicone sealant.

2.2 FIBERGLASS REINFORCED POLYESTER DOORS (FRP)

A. Doors

(1) “Special Lite” SL-17 doors or FRP Architectural Doors FD25 with vision lite as detailed. Color to be selected from standard colors for face sheets.

(2) **Material:** Polyurethane core at 5 lbs. per cubic foot density with frames extruded from aluminum alloy 6063-T5 in clear anodized aluminum, face sheets (interior and exterior) shall be fiberglass reinforced acrylic modified polyester, .120” thickness, with deeply embossed pebble grain finish. Face sheets to be manufactured by the resin transfer molding process (RTM) with continuous strand E glass mat and 20 mil glass surface veil.

3. EXECUTION

3.1 SHOP FABRICATION

A. Fabricate all work to conform with details and profiles shown on the Contract Documents and approved shop drawings.

B. Leave all joints neatly formed and seamless in appearance. Leave all surfaces free from warps, buckles, and other defects.

C. Prepare metal doors and frames for finishing by completely removing all rust, grease, and dirt. Fill minor surface imperfections with metallic compounds.

D. Finish all surfaces of the work, both inside and outside.

3.2 DELIVERY AND INSTALLATION

A. Deliver doors and frames to site for installation by masons and carpenters.

END OF SECTION 08100
SECTION 08200 - WOOD DOORS

1. GENERAL

1.1 SCOPE

A. Furnish and deliver to the job site all scheduled wood doors complete with cut-outs, wood and/or metal stickings and wood astragals.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01035 - Alteration Work Procedures.
(3) Section 02050 - Demolition.
(4) Section 06100 - Carpentry.
(5) Section 06200 - Millwork.
(6) Section 08100 - Metal Frames and Doors.
(7) Section 08400 - Aluminum Entrances.
(8) Section 08700 - Finish Hardware.
(9) Section 08800 - Glass and Glazing.
(10) Section 09900 - Painting and Finishing.
(11) Section 10400 - Identification Devices.

1.2 SHOP DRAWINGS

A. Submit shop drawings and manufacturer's product data in accordance with the conditions of the Contract.

B. Mouldings, stickings, and astragals shall be drawn full size.

C. Submit two (2) samples, 12" x 12", to the Architect representing extremes of color finish and selected sheen.

1.3 WARRANTIES

A. Interior doors shall be warranted by the manufacturer for the life of the installation.

B. Manufacturer shall issue written warranties to the Owner only after inspecting the installed and finished doors and before the issuance of final payment to the Contractor.

1.4 QUALITY ASSURANCE

A. All doors shall conform to the material and construction requirements of AWI (The Architectural Woodwork Institute) Section 1300, for premium grade doors.

B. All labeled doors must meet the design and construction requirements of, and bear the label of, Underwriters Laboratories (U.L.) or Warnock Hersey International.

C. All fire rated wood doors shall have a positive pressure label in accordance with UL 10C (IBC).

D. All doors that are factory finished, shall have the same factory finish for the transom panel.

E. All labeled doors and smoke doors required by code to be tested in accordance with UL-10C shall bear a "positive pressure" label. Where intumescent seals are required, they shall be integral with the door, not surface applied to the frame.

2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. These specifications refer to products of the Marshfield Door Systems, Inc.

B. Comparable products, in the Architect's judgment, from the following manufacturers will be accepted.

(1) Algoma Hardwoods, Inc.
(2) Eggers Hardwood Products Corporation.
(3) Graham Manufacturing Corporation.
(4) VT Industries, Inc.
(5) Buell Door Company.
(6) Oshkosh Architectural Door Company.
(7) Mohawk.

2.2 INTERIOR FLUSH DOORS - SOLID CORE (No Label)

A. Model: Particle board core DPC-1; 1¾" thickness.
B. Veneer: As specified in Part 2.4.
C. AWI #: PC-5 (5-ply).

2.3 INTERIOR FLUSH DOORS - ¾(hr) rating ("C" LABELED)

A. Model: Mineral Core DFM-45; 1¾" thickness.
B. Veneer: As specified in Part 2.4.
C. Label: Hinge side shall display U.L-45 minute label.
D. AWI #: FD ¾ - 5 (5-ply).

2.4 VENEERS

A. Wood face veneer species and matching for transparent finishes.

(1) Face veneer species and matching shall conform to the requirements of the Architectural Woodwork Institute Standard 1300-S-1 for premium grade “A” doors.

(a) The wood face veneers shall conform to the requirements of the National Woodwork Manufacturer's Associations Industry Standard, I.S. 1-78, for premium grade.
(b) Vertical edges shall be the same species as the face veneer except on fire rated doors which shall have treated edges.
(c) No finger joints shall be permitted on the lock edge.
(d) Pair matching of veneers shall be side matched.
(e) Sticking and moulding shall be the same species as the face veneer.
(f) Frame for vision panels in 20-minute doors and non-labeled doors shall be wood, similar to Marshfield Door Systems W-3.
(g) Color for vision panel is to match existing panels of adjacent doors or as directed by the Architect.

(2) The wood face veneers shall conform to the requirements of the Architectural Woodwork Institute Standard 1300-S-1 for quality characteristics for premium grade.

(3) Face veneers for transparent finishes shall be:

(a) Rotary cut, Natural Birch.

(4) All doors shall be factory finished comparable to AWI Standard No. 5, catalyzed polyurethane, premium grade. Stain color shall be selected by the Architect. Finish sheen shall be semi gloss as selected by the Architect. Selected stain and sheen shall be applied to the samples submitted for review.
3. EXECUTION

3.1 MANUFACTURER'S RESPONSIBILITIES

A. Prepare doors in accordance with approved shop drawings and deliver to the site in first-class condition for storage, handling, and installation by other trades.

B. The manufacturer shall not cut out any part of the door that will void the manufacturer's warranty, even if the cut out is detailed or scheduled without first noting on the shop drawings which doors will not be warranted and the reason for withholding the warranty. The Architect will then either change the detail or accept the door without warranty.

3.2 STORAGE AND HANDLING

A. Only handle doors with clean gloves. Protect doors from stains, hand prints, and scratches.

B. Store doors flat and level, off of the floor in a well-ventilated area.

C. Protect doors from low and high humidity. Maintain relative humidity between 30% and 60%.

D. Seal edges within one week of delivery.

E. Protect doors from light with black, 6 mil. polyethylene sheeting; allow air circulation.

3.3 INSTALLATION

A. Fit doors with maximum clearance of ⅛" at top and sides; 3/16" at bottom over thresholds and ½" at bottom where no threshold occurs.

B. When planing to fit, trim equally from both sides.

C. Do not trim more than ¾" from any side of unlabeled doors. For labeled doors, do not reduce width by more than 1/16" overall, do not trim top, do not trim bottom more than 1".

D. Bevel edges ⅛" in 2" for proper clearance.

E. Seal all edges including holes and routes for hardware immediately after fitting.

F. If field adjustment of factory finished doors is required, repair the finish as required by the manufacturer to maintain the warranty.

G. Do not remove fire door labels.

END OF SECTION 08200
1. GENERAL

1.1 SCOPE

A. Furnish all labor, material, equipment and services required to fabricate and install the rolling overhead door as specified herein and as shown on the drawings.

B. Related work specified elsewhere:

   (1) Section 03100 - Concrete and Cement Work.
   (2) Section 04200 - Masonry and Mortar Materials.
   (3) Section 05000 - Miscellaneous Metal.
   (4) Section 06100 - Carpentry.
   (5) Section 09900 - Painting and Finishing.

1.2 SUBMITTALS

A. Submit shop drawings in accordance with the conditions of the contract.

B. Submit a slat sample that shows the insulation and finish specified.

1.3 QUALIFICATIONS

A. Products specified herein refer to the products of The Cookson Company. Atlas and Overhead Door are acceptable manufacturers when meeting or exceeding the requirements of the specified product.

B. Products of other manufacturers will be considered when requested in accordance with the Supplementary Conditions and when meeting or exceeding the requirements of the specified products.

2. PRODUCTS

2.1 ROLLING OVERHEAD DOOR

A. The rolling overhead door shall be The Cookson Company Thermiser Model ESD20, with the following characteristics:

   (1) **Curtains:** Shall be an assembly of interlocking slats (front and back), roll-formed, fully formed-in-place, insulated, CFC and HCFC-free, flat profile, mounted on face of wall. The front slats shall be fabricated from minimum 22 gauge galvanized steel. The back slats shall be fabricated from minimum 24 gauge galvanized steel. Endlocks will be attached to each end of alternate slats to prevent lateral movement.

   (2) **Bottom Bar:** Two (2) prime painted galvanized steel angles with a minimum thickness of ⅛", and shall have a bottom weatherseal.

   (3) **Spring Counterbalance:** Shall be helical torsion springs designed for standard 20,000 cycles. Counterbalance shall be housed in a steel pipe, protected from corrosion.

   (4) **Bracket Plates:** Minimum of ¼" thick galvanized steel plate.

   (5) **Guides:** Shall be three (3) structural steel angles, galvanized, with a minimum thickness of 3/16". Guides shall be weatherstripped with vinyl.

   (6) **Hood:** 24 gauge galvanized steel. Furnish a neoprene air baffle to prevent air passage through the hood. (Hood shall completely enclose the unit, provide removable access panels where required for maintenance and/or adjustment).

   (7) **Finish:** Curtain slats and hood shall be galvanized per ASTM A-525 and shall receive a rust inhibitive, baked on prime paint and a “Color-Cote” powder coat finish, color as selected by the Architect.
(8) **Weatherstripping**: Provide full door weatherstripping, "All-Weather", at the sill, hood and guides.

(9) **Anchors**: All anchors required to install the rolling overhead door shall be stainless steel.

(10) **Operation**: Motorized with Model MG operator.

(11) **Locking**: Provide for cylinder locking at each end. Cylinders are provided in Section 08700, Finish Hardware.

(12) **Miscellaneous Accessories**: Provide all miscellaneous accessories required to complete the installation.

(13) The rolling doors shall have installed on the bottom bar a safety device that will automatically reverse the door if the device detects an obstruction in the downward travel of the door.

- The safety edge shall consist of a rubber boot attached below the bottom bar with a switch secured to the back of the bottom bar. The edge shall operate with air wave technology and shall not rely on pneumatic pressure or electrical contracts to operate. It shall create an air wave that shall be detected by the switch which reverse the downward direction of the rolling door.
- The safety edge shall not require a connection cord or any means of electrical connection to the motor control panel.
- The safety edge shall be of fail-safe construction and on every cycle shall perform a self diagnostic test. If any part of the safety edge fails, the door closing operation shall change from momentary pressure to constant pressure requiring constant pressure on the close control station to move the door in a downward motion. Repairing the safety edge will automatically return the closing operation to momentary pressure.
- The operation of the safety edge shall not be subject to interferences by temperature, barometric pressure, water infiltration or punctures and small tears.
- The safety edge shall perform with an extremely small amount of impact pressure.

3. **EXECUTION**

3.1 **GENERAL**

A. The rolling overhead door shall be completely installed as detailed on the drawings and specified herein.

B. The rolling overhead door and all components shall be properly anchored and installed according to the manufacturers recommendations and instructions. All anchors shall be stainless steel.

C. The rolling overhead door shall be thoroughly cleaned, adjusted, and tested for proper operation prior to acceptance by the Owner.

END OF SECTION 08331
1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, equipment and accessories necessary to complete the installation of the aluminum entrance work described in the Contract Documents.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01100 - Reserved Items.
(3) Section 01035 - Alteration Work Procedures.
(4) Section 02050 - Demolition.
(5) Section 03100 - Concrete and Cement Work.
(6) Section 04200 - Masonry and Mortar Materials.
(7) Section 05000 - Miscellaneous Metal.
(8) Section 05100 - Structural Steel.
(9) Section 06100 - Carpentry.
(10) Section 06200 - Millwork.
(11) Section 07600 - Sheet Metal.
(12) Section 07900 - Caulking and Sealants.
(13) Section 08100 - Metal Frames and Doors.
(14) Section 08200 - Wood Doors.
(15) Section 08500 - Metal Windows.
(16) Section 08700 - Finish Hardware.
(17) Section 08800 - Glass and Glazing.
(18) Section 09250 - Gypsum Wallboard (Drywall).
(19) Section 09500 - Acoustical Ceiling.
(20) Section 09900 - Painting and Finishing.

1.2 SHOP DRAWINGS

A. Submit shop drawings and manufacturer's product data, for all systems, in accordance with the conditions of the Contract.

1.3 QUALIFICATIONS

A. Doors and frames specified herein refer to products of the Kawneer Company Incorporated.

B. Doors and frames of the following manufacturers are acceptable when meeting or exceeding the specifications:

(1) EFCO.
(2) Architectural Aluminum and Glass Co., Inc
(3) Vistawall Architectural Products.

C. Products of other manufacturers will be considered when requested in accordance with the Supplementary Conditions.

D. Warranty period shall be two (2) years from date of substantial completion.

E. All doors shall be provided with a limited lifetime warranty covering the welded door corner construction.
2. PRODUCTS

2.1 FRAMES (GLASS AND DOOR)

A. Series: TRI FAB 451T, 2” x 4½” tube framing system (for 1” thick glazing).
B. Material: Tube frames shall be extruded from aluminum alloy 6063-T5, .080” thick walls with compatible finish specified.
C. Provide other tube sizes as detailed to complete the installation.
D. Provide glass stops for dry glazing of all glass. Glazing gaskets shall be EPDM Elastomeric Extrusions.
E. Provide weatherstripped door stops, continuous at head and jambs.
F. Provide additional sizes, shapes and miscellaneous trim for interior and exterior conditions not specifically detailed as required for a complete installation that provides both a complete weatherproof installation and finished installation of aluminum framing and trim to adjacent finish materials.

2.2 DOORS AND HARDWARE

A. "500" Wide stile doors, 5" vertical stiles, 8" top rail, 8¼" mid rail, and 10" bottom rail. Doors will include meeting stile gaskets and door sweeps.
B. Material: Tube frames extruded from aluminum alloy 6063-T5, .125" thick walls, with compatible finish specified, and aluminum stops.
C. Door Hardware: Refer to Specification Section 08700.

2.3 FASTENING DEVICES AND MISCELLANEOUS ITEMS

A. Screws, nuts, washers, bolts, rivets, and other miscellaneous fastening devices shall be of aluminum, stainless steel or other non-corrosive materials compatible with aluminum.
B. Include closures, metal trim and miscellaneous accessory finish trim, vinyl gaskets, mouldings, glass stops, anchor bolts, clips, and screws for complete installation.

2.4 FINISH

A. All exposed surfaces, devices, hardware and stops shall be free of scratches and blemishes.
B. Aluminum mouldings shall be given a caustic etch followed by an anodic oxide treatment to obtain the following finish:

(1) Shall be an Architectural Class II clear anodic coating conforming to Aluminum Association Standard AA-M12 C22 A31 (#17 Clear).

3. EXECUTION

3.1 FABRICATION

A. Form all sections with clean, straight, sharply defined profiles and free from defects impairing strength or durability.
B. Accurately join and fit corners to flush hairline joint.
C. Cutouts, recesses, mortising or milling operations required for hardware shall be accurately made and reinforced with backing plates as required.
D. Provision shall be made for field jointing of frame sections which cannot be fabricated or shipped as single units.
3.2 INSTALLATION

A. Workmanship

(1) Work shall be highest quality possible.
(2) Protect all exposed portions of frames and other aluminum from plaster, lime, acid, cement, grinding and polishing machines and all harmful compounds. Do not apply sprayed on protective coatings to aluminum where caulking is indicated.
(3) All joints shall be fitted to hairline joinery and properly reinforced.
(4) Provide and install all necessary accessories, metal trim and closure pieces from framing to adjacent finish materials to provide both a complete weather proof installation and a finished installation between aluminum framing system and adjacent finish materials, whether detailed or not.
(5) Contractor shall be responsible for field verifying opening conditions to identify, provide and install all miscellaneous accessories and metal trim for complete finished installation. The opening sizes at interior and exterior conditions may vary and require installation of trim to finish the installation to provide a complete system.

B. Erection

(1) Erect all door frames and sash settings plumb, square, level and at proper elevation and plane.
(2) Back paint aluminum with bituminous paint on surfaces in contact with steel, concrete, masonry or any other dissimilar material.
(3) Frames shall be anchored securely in place.
(4) Fixed glass sills and thresholds shall be set in non-hardening caulking compound.
(5) All aluminum to aluminum joints shall be sealed with proper sealant for condition involved, making complete unit water and weathertight.
(6) Install all hardware and adjust for proper operation.

C. Cleaning Up

(1) Clean all aluminum with plain water or a petroleum product, no abrasive cleaning agents shall be used.
(2) Remove all crating and debris incurred with work under this subcontract.

END OF SECTION 08400
SECTION 08500 - METAL WINDOWS

1. GENERAL

1.1 SCOPE

A. Furnish labor, material, services, and equipment necessary to fabricate, deliver, and install metal window units including frame, sash, glazing beads, hardware, weatherstripping, screens, miscellaneous metal trim, and finish pieces required for complete installation.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01035 - Alteration Work Procedures.
   (3) Section 01100 - Reserved Items.
   (4) Section 02050 - Demolition.
   (5) Section 03100 - Concrete and Cement Work.
   (6) Section 04200 - Masonry and Mortar Material.
   (7) Section 05000 - Miscellaneous Metal.
   (8) Section 05100 - Structural Steel.
   (9) Section 06100 - Carpentry.
   (10) Section 06200 - Millwork.
   (11) Section 07600 - Sheet Metal.
   (12) Section 07900 - Caulking and Sealants.
   (13) Section 08100 - Metal Frames and Doors.
   (14) Section 08400 - Aluminum Entrance.
   (15) Section 08550 - Wood Windows.
   (16) Section 08800 - Glass and Glazing.
   (17) Section 09250 - Gypsum Wallboard (Drywall).
   (18) Section 09500 - Acoustical Ceilings.
   (19) Section 09900 - Painting and Finishing.

1.2 SHOP DRAWINGS AND SAMPLES

A. Submit complete shop drawings in accordance with the conditions of the Contract.

B. Submit two (2) six inch (6") long sections of aluminum with the specified finish for approval by the Architect prior to fabrication.

1.3 QUALIFICATIONS

A. This specification refers to products of the Winco Windows, products of the following manufacturer will also be accepted:

   (1) Kawneer Company.
   (2) EPCO Corporation.

B. All windows shall meet or exceed performance requirements of ANSI/AAMA 101-93 DH - AW50 Specifications and shall bear label of conformance.

C. Products of other manufacturers conforming with these specifications and adaptable to the conditions detailed will be considered when requested in accordance with the conditions of the Contract and when accompanied by a sample window section. In the absence of specific approval, windows shall be furnished as specified.

1.4 WARRANTY

A. Warrant complete window system for a period of two (2) years against workmanship and defects, after Substantial Completion.

B. Warrant insulated glass for a period of five (5) years against defects, after substantial completion.
2. PRODUCTS

2.1 WINDOWS – TYPE “A” (FIXED EXTERIOR)

A. Windows specified herein are Winco Series, 3350 thermal, heavy commercial fixed units with 1” glazing.

B. Frame and Ventilator Sections

1. Members shall be extruded from 6063-T5 alloy aluminum.
2. Main frame and sash members shall have a nominal wall thickness of not less than 0.062 inches. Frame sill members shall have a nominal wall thickness of not less than 0.094 inches.
3. The main frame section shall be:
   a. 3½” wide – Series 3350 – Winco Series.
4. All glazing legs shall be ½” minimum deep.

2.2 WINDOWS – Type “B” (Ballistic Transaction Window)

A. Windows specified herein are AVT Bullet resisting Transaction Windows.

B. Construction

1. Window
   a. The window has extruded aluminum sides around voice tubes which surround the vertical and top edge of bullet resistant glazing.
   b. Window glazing materials help to protect against Threat Level 2, based on UL752 ballistic standards for specified bullet resistance.
   c. The bullet resistant protection level may be specified by the end user and be consistent with the treat level.

2. Voice Rail Finish (optional voice rail finished include):
   a. Painted. Color as selected by the Architect.

3. Countertop/Base
   a. The standard base is constructed from layered particle board with a plastic laminate covering.
   b. The base is armored with bullet resisting material consistent with the threat level as defined.
   c. The deal tray is stainless steel with a bullet-trap below.

2.3 MISCELLANEOUS ACCESSORIES

A. Double weatherstripping shall be of vinyl plastic or wool pile set into integral slot.
B. Metal glazing beads shall be Interior Glazed. Glazing beads shall be factory fit snap-in.
C. Fasteners, bolts, screws, etc.: Series #300 stainless steel shall be used for aluminum work or for attaching aluminum to dissimilar metals. Provide galvanized angle clips and anchors for attachment as required.
D. Provide all necessary extruded aluminum trim shapes, accessories, snap on trim, mullions, stacking bars, and flush covers as required to complete finished installation. All items shall be extruded of 6063-T5 alloy, finished to match windows.
E. Finish

(1) All units shall be free from scratches and blemishes.
(2) All exposed aluminum shall be clear anodized equal to Alcoa Alumilite 204-R1.

F. Thermal barrier shall be poured polyurethane fill

2.4 FABRICATION

A. Frames: Corners shall be coped, mortised, and tenoned, or tenoned and riveted. Joints shall be carefully fitted to hairline joinery. Sill joints shall be constructed in such a manner as to guarantee permanent watertightness.

B. Ventilators: Corner shall be mitered, mechanically joined, and heliarc welded.

C. All window and anchorage members shall be designed to have deflection of not more than 1/175 of span when subjected to a uniform wind load of 15 lbs. per s.f.

3. EXECUTION

3.1 INSTALLATION

A. Layout and set or assist in setting all window units providing all necessary blocking and bracing to hold windows securely in place.

B. Entire assembly shall be installed to provide weathertight walls.

C. Secure windows in place to plumb and level condition.

D. Windows shall be anchored securely so that work will not be distorted nor fasteners over-stressed from expansion and contraction of the metal.

E. Protect aluminum from contact with dissimilar materials by use of asphaltic paint or sash tape.

F. Make adjustments for proper operation of ventilating units before and after glazing.

G. Provide accessories, trim and finish materials to provide a complete finished installation at exterior and interior for a full closure from window to adjacent materials complete.

3.2 CLEANING AND PROTECTION

A. Upon completion of the installation, all finished surfaces shall be cleaned with mineral spirits and mild soap and water. No abrasive cleaning agents shall be employed.

B. Protect all aluminum surfaces from brick cleaning solutions.

END OF SECTION 08500
SECTION 08700 - FINISH HARDWARE

1. GENERAL

1.1 SCOPE

A. Furnish labor, material, services, hardware templates, and equipment required to complete the installation of the finish hardware.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 06100 - Carpentry.
(3) Section 06200 - Millwork.
(4) Section 08100 - Metal Frames and Doors.
(5) Section 08200 - Wood Doors.
(6) Section 08331 - Overhead Rolling Grilles.
(7) Section 08400 - Aluminum Entrance Work.
(8) Hardware for fabricated items, such as electric panels, access panels, smoke hatch, etc., specified under their respective sections, unless specifically noted herein.

1.2 SCHEDULE (SHOP DRAWINGS)

A. Complete schedule of all hardware items, indicating locations for which intended, shall be submitted in accordance with provisions of the General Conditions and Supplementary Conditions relating to shop drawings.

B. Submit product specification sheets (catalog cut sheets) for all hardware items scheduled for use on this project.

1.3 QUALIFICATIONS

A. Products specified herein shall be that of the listed manufacturers in the products section.

B. All items shall be furnished as hereinafter specified with NO SUBSTITUTIONS, unless unavailable, or unless specifically approved herein, or by Addendum.

C. All hardware shall have a warranty as outlined below and shall commence from the date of substantial completion.

(1) Lock and Latch Sets: Five (5) years.
(2) Panic Devices: Five (5) years.
(3) Closers: Ten (10) years.
(4) Continuous Hinges: Ten (10) years.
(5) All other hardware: One (1) year.

1.4 GENERAL

A. The Contractor shall accept full responsibility for the accuracy and completeness of catalog designations, to assure proper size and types of hardware and fastening devices and shall be responsible for checking possible interferences among the devices specified for a single application.

B. Hardware and templates shall be delivered in accordance with the following:

(1) Templates and hardware items, which must be shop-applied or require shop preparation, shall be shipped prepaid to the Subcontractors involved.
(2) All other hardware items shall be delivered to the job and turned over to the General Contractor who shall be responsible for proper storage and handling.
(3) Subcontractors receiving hardware shall be responsible for storage and protection of material after delivery.

C. The Contractor shall have in his employ an experienced person to receive, take charge of, and distribute hardware.
D. Materials shall be new and shall be furnished as specified under the hardware groups listed.
E. Hardware shall be neatly packed and bear label of identification as to where it is to be applied in accordance with the approved schedule.
F. Provide sex bolts and back-up plates for all hardware on "B" label doors.
G. All locks shall be keyed and master-keyed into the existing Best keying system. The Contractor shall be responsible for providing the final cores and keys (2 per lock) to the Owner for installation and distribution. The Contractor will also provide removable construction cores until the final cores are delivered.
H. All hardware scheduled for use on labeled doors shall be certified for use on the label required.

2. PRODUCTS

2.1 MANUFACTURERS

A. Hardware shall be that of the listed manufacturers and as scheduled in the following hardware groups.
B. List of manufacturers:
   (1) Butts: Hager Hinge Company - Stanley or McKinney are acceptable.
   (2) Concealed Continuous Geared Hinges: Hager Roton continuous geared hinges or Select Hinges continuous geared hinges.
   (3) Lock and Latch Sets: BEST – No substitutions.
   (4) Panic Devices: Von Duprin 9800 series – No substitutions.
   (5) Closers: LCN – No substitutions.
   (6) Push Plates and Pulls: Baldwin - Rockwood, National Guard and Burns are acceptable.
   (7) Kickplates: Baldwin - Rockwood, National Guard and Burns are acceptable.
   (8) Stops: Ives - Rockwood, Baldwin and Burns are acceptable.
   (9) Flush Bolts: Ives - Baldwin is acceptable.
   (10) Thresholds, weatherstripping, astragals, watersheds: National Guard - Zero or Pemko are acceptable.
   (11) Soundstripping: National Guard - Zero or Pemko are acceptable.
   (12) Removable Mullion: Precision Hardware, Inc.

2.2 HARDWARE SCHEDULE

A. See schedule following Part 3: Execution.

3. EXECUTION

3.1 GENERAL

A. Installation
   (1) Receive, store, and be responsible for all finish hardware.
   (2) Apply hardware in accordance with manufacturer's instructions; fit accurately. Apply securely and adjust carefully. Use care not to damage work when applying hardware.
   (3) Install thresholds in non-hardening caulking to provide weathertight seal.
   (4) Fit locks or latches in doors. Remove for painting of doors. Replace and apply all other hardware after painting.
   (5) Adjust all operating hardware for smooth performance.
4. HARDWARE SCHEDULE

4.1 HARDWARE SCHEDULE:

A. Group No. 1:  
(Door No. 1  
(Pair, aluminum frame / FRP doors, exterior)

<table>
<thead>
<tr>
<th>Butts:</th>
<th>Hager</th>
<th>2 x Roton 780-112HD x EPT Prep x Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panic Device (Standard):</td>
<td>Von Duprin 1 x CD-9847-996L-17 x US26D x 2 cylinders</td>
<td></td>
</tr>
<tr>
<td>Panic Device (Electric):</td>
<td>Von Duprin 1 x EL-9847-996L-17 x US26D x 2 cylinders</td>
<td></td>
</tr>
<tr>
<td>Panic Device Trim:</td>
<td>Von Duprin 1 x AD-200-993R-70-MTK-SPA-626-BD x Best Core</td>
<td></td>
</tr>
<tr>
<td>Closers (Push Side):</td>
<td>LCN 2 x P4041XP-3049CNS x Aluminum x TB x ADA</td>
<td></td>
</tr>
<tr>
<td>Threshold:</td>
<td>Special-Lite Manufacturer's standard 4” threshold x Aluminum</td>
<td></td>
</tr>
<tr>
<td>Weatherstripping:</td>
<td>Special-Lite Manufacturer's standard, entire perimeter of doors</td>
<td></td>
</tr>
<tr>
<td>Door Sweeps:</td>
<td>NGP 2 x 198NA</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
(a) Sequence of operation shall be provided by the contractor to coordinate with video intercom/push-button access and emergency locking controlled from Reception Desk. (See Electrical Drawings for additional information).
(b) Authorized key access will be provided for emergency conditions. Free egress at all times by depressing touch bar of panic device.
(c) Contractor shall coordinate all necessary hook-ups and operation.
(d) At panic devices, contractor shall provide auxiliary control modules required to all dry-contact closure to energize electrified solenoid. Two dry-contact control points required.

B. Group No. 2:  
(Doors No. 2, 14  
(Single, non-rated, wood door, metal frame, interior – General Office)

<table>
<thead>
<tr>
<th>Butts:</th>
<th>Hager</th>
<th>Roton 780-112HD x EPT Prep x Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closer (Push Side):</td>
<td>LCN</td>
<td>P4041XP-3049EDA x Aluminum x TB x ADA</td>
</tr>
<tr>
<td>Power Transfers:</td>
<td>Von Duprin</td>
<td>As required by Manufacturer</td>
</tr>
<tr>
<td>Power Supply:</td>
<td>Von Duprin</td>
<td>As required by Manufacturer</td>
</tr>
<tr>
<td>Door Position Switches:</td>
<td>Von Duprin</td>
<td>As required by Manufacturer</td>
</tr>
<tr>
<td>Lockset (Intruder):</td>
<td>Best</td>
<td>9K-3-7-IN-15-K-S3-626</td>
</tr>
<tr>
<td>Kickplate:</td>
<td>Rockwood</td>
<td>10” high x Door width less 2” x 0.050” S.S. x B4E x US32D</td>
</tr>
<tr>
<td>Sound Stripping:</td>
<td>NGP</td>
<td>Heads and Jambs – 5050B</td>
</tr>
<tr>
<td>Wall Stop:</td>
<td>Ives</td>
<td>WS401CCV x US26D</td>
</tr>
</tbody>
</table>

Notes:
(a) Sequence of operation shall be provided by the contractor to coordinate with video intercom/push-button access and emergency locking controlled from Reception Desk. (See Electrical Drawings for additional information).
(b) Authorized key access will be provided for emergency conditions. Free egress at all times by depressing touch bar of panic device.
(c) Contractor shall coordinate all necessary hook-ups and operation.

C. Group No. 3:  
(Doors No. 3, 6, 7, 8, 26  
(Single, non-rated, wood door, metal frame, interior – Break Room, Offices, Conference Room)

<table>
<thead>
<tr>
<th>Butts:</th>
<th>Hagar</th>
<th>1½ Pair x BB1279 x 4½x4½ x US26D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockset (Intruder):</td>
<td>Best</td>
<td>9K-3-7-IN-15-K-S3-626</td>
</tr>
<tr>
<td>Kickplate:</td>
<td>Rockwood</td>
<td>10” high x Door width less 2” x 0.050” S.S. x B4E x US32D</td>
</tr>
<tr>
<td>Sound Stripping:</td>
<td>NGP</td>
<td>Heads and Jambs – 5050B</td>
</tr>
<tr>
<td>Wall Stop:</td>
<td>Ives</td>
<td>WS401CCV x US26D</td>
</tr>
</tbody>
</table>

D. Group No. 4:  
(Doors No. 4, 5  
(Single, non-rated, wood door, metal frame, interior – Storage, Electric)

<table>
<thead>
<tr>
<th>Butts:</th>
<th>Hagar</th>
<th>1½ Pair x BB1279 x 4½x4½ x US26D</th>
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</thead>
<tbody>
<tr>
<td>Lockset (Storeroom):</td>
<td>Best</td>
<td>9K-3-7-D-15-K-S3-626</td>
</tr>
<tr>
<td>Kickplate:</td>
<td>Rockwood</td>
<td>10” high x Door width less 2” x 0.050” S.S. x B4E x US32D</td>
</tr>
<tr>
<td>Wall Stop:</td>
<td>Ives</td>
<td>WS401CCV x US26D</td>
</tr>
</tbody>
</table>
E. Group No. 5:  Doors No. 9, 10, 18, 19, 27
(Single, fire-rated, wood door, metal frame, interior – Shop Access)

Butts: Hager  Roton 780-112HD x Aluminum
Closer (Push Side): LCN  P4041XP-3077CNS x Aluminum x TB x ADA
Lockset (Intruder): Best 9K-3-7-IN-15-K-S3-626
Armor Plates: Rockwood 2 x 34" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Sound Stripping: NGP  Heads and Jambs – 5050B
Door Sweep: NGP  198N x Aluminum

F. Group No. 6:  Door No. 11, 36
(Single, non-rated, wood door, metal frame, interior – Janitor Closet, Storage)

Butts: Hager  Roton 780-112HD x Aluminum
Lockset (Storeroom): Best 9K-3-7-D-15-K-S3-626
Armor Plates: Rockwood 2 x 34" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Door Sweep: NGP  198N x Aluminum

G. Group No. 7:  Doors No. 12, 13, 24, 25
(Single, non-rated, wood door, metal frame, interior – Individual Toilets)

Butts: Hagar  1½ Pair x BB1279 x 4½x4½ x US26D
Lockset (Office): Best 9K-3-7-B-15-K-S3-626
Kickplate: Rockwood 10" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Wall Stop: Ives  WS401CCV x US26D

H. Group No. 8:  Doors No. 15, 17
(Pair, non-rated, wood door, metal frame, interior – Meeting Room)

Butts: Hagar  2 x Roton 780-112HD x Aluminum
Closers (Push Side): LCN  2 x P4041XP-3049EDA x Aluminum x TB x ADA
Panic Devices: Von Duprin 2 x CD9827-LBR x US26D x 4 cylinders
Kickplates: Rockwood 2 x 10" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Wall Stops: Ives  2 x WS401CCV x US26D
Door Sweeps: NGP  2 x 198N x Aluminum
Sound Stripping: NGP  5050B entire perimeter of frame

I. Group No. 9:  Door No. 16
(Pair, non-rated, wood door, metal frame, interior – Closet)

Butts: Hagar  3 Pair x BB1279 x 4½x4½ x US26D
Lockset (Office): Best 9K-3-7-B-15-K-S3-626
Kickplates: Rockwood 2 x 10" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Flush Bolts: Ives  2 x WS401CCV x US26D

J. Group No. 10:  Doors No. 20, 21
(Single, non-rated, wood door, metal frame, interior – Gang Toilets)

Butts: Hagar  Roton 780-112HD x Aluminum
Closer (Push Side): LCN  P4041XP-3049EDA x Aluminum x TB x ADA
Push/Pull Plate: Rockwood 110 x 73C/73CL x US26D
Security Deadbolt: Best 83T-7-S x 626
Armor Plate: Rockwood 34" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Wall Stop: Ives  WS401CCV x US26D
Door Sweep: NGP  198N x Aluminum

K. Group No. 11:  Door No. 22
(Single, fire-rated, wood door, metal frame, interior – Sprinkler Room)

Butts: Hager  Roton 780-112HD x Aluminum
Closer (Push Side): LCN  P4041XP-3077CNS x Aluminum x TB x ADA
Lockset (Storeroom): Best 9K-3-7-D-15-K-S3-626
Kickplate: Rockwood 10" high x Door width less 2" x 0.050" S.S. x B4E x US32D
Wall Stop: Ives  WS401CCV x US26D
Door Sweep: NGP  198N x Aluminum
L. Group No. 12: **Doors No. 23, 40**  
(Single, aluminum frame / FRP door, exterior)

- **Butts:** Hager  
  Roton 780-112HD x EPT Prep x Aluminum
- **Panic Device (Electric):** Von Duprin  
  EL-9847-996L-17 x US26D x 2 cylinders
- **Panic Device Trim:** Von Duprin  
  AD-200-993R-70-MTK-SPA-626-BD x Best Core
- **Closer (Push Side):** LCN  
  P4041XP-3049CNS x Aluminum x TB x ADA
- **Threshold:** Special-Lite  
  Manufacturer's standard 4" threshold x Aluminum
- **Weatherstripping:** Special-Lite  
  Manufacturer's standard, entire perimeter of doors
- **Door Sweeps:** NGP  
  198NA

**Notes:**
(a) Sequence of operation shall be provided by the contractor to coordinate with video intercom/push-button access and emergency locking controlled from Reception Desk. (See Electrical Drawings for additional information).
(b) Authorized key access will be provided for emergency conditions. Free egress at all times by depressing touch bar of panic device.
(c) Contractor shall coordinate all necessary hook-ups and operation.
(d) At panic devices, contractor shall provide auxiliary control modules required to all dry-contact closure to energize electrified solenoid. Two dry-contact control points required.

M. Group No. 13: **Door No. 28**  
(Pair, fire-rated, wood door, metal frame, interior – Storage)

- **Butts:** Hager  
  2 x Roton 780-112HD x Aluminum
- **Closers (Pull Side):** LCN  
  2 x P4041XP-3077EDA x Aluminum x TB x ADA
- **Lockset (Office):** Best  
  9K-3-7-B-15-K-S3-626
- **Armor plates:** Rockwood  
  4 x 34" high x Door width less 2” x 0.050" S.S. x B4E x US32D
- **Wall Stops:** Ives  
  2 x WS401CCV x US26D
- **Door Sweeps:** NGP  
  2 x 198N x Aluminum
- **Lock Guard:** Ives  
  LG10 x US32D

N. Group No. 14: **Door No. 29**  
(Single, aluminum frame / FRP door, interior – Wash Bay)

- **Butts:** Hager  
  Roton 780-112HD x Aluminum
- **Lockset (Office):** Best  
  9K-3-7-B-15-K-S3-626
- **Closer (Push Side):** LCN  
  P4041XP-3077CNS x Aluminum x TB x ADA
- **Threshold:** Special-Lite  
  Manufacturer's standard 4" threshold x Aluminum
- **Weatherstripping:** Special-Lite  
  Manufacturer's standard, entire perimeter of doors
- **Door Sweeps:** NGP  
  198NA

O. Group No. 15: **Doors No. 31, 35, 37**  
(Single, existing metal frame / new FRP door, exterior)

- **Butts:** Hager  
  Roton 780-112HD x EPT Prep x Aluminum
- **Panic Device (Electric):** Von Duprin  
  EL-9847-996L-17 x US26D x 2 cylinders
- **Panic Device Trim:** Von Duprin  
  AD-200-993R-70-MTK-SPA-626-BD x Best Core
- **Closer (Push Side):** LCN  
  P4041XP-3049CNS x Aluminum x TB x ADA
- **Threshold:** Special-Lite  
  Manufacturer's standard 4" threshold x Aluminum
- **Weatherstripping:** Special-Lite  
  Manufacturer's standard, entire perimeter of doors
- **Door Sweeps:** NGP  
  198NA

**Notes:**
(a) Sequence of operation shall be provided by the contractor to coordinate with video intercom/push-button access and emergency locking controlled from Reception Desk. (See Electrical Drawings for additional information).
(b) Authorized key access will be provided for emergency conditions. Free egress at all times by depressing touch bar of panic device.
(c) Contractor shall coordinate all necessary hook-ups and operation.
1.1 SCOPE

A. Provide all material, labor, equipment, and accessories required to complete the installation of the glass and glazing described in the Contract Documents.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01035 - Alteration Work Procedures.
   (3) Section 01100 - Reserved Items.
   (4) Section 02050 - Demolition.
   (5) Section 05000 - Miscellaneous Metal.
   (6) Section 06100 - Carpentry.
   (7) Section 06200 - Millwork.
   (8) Section 07900 - Caulking and Sealants.
   (9) Section 08100 - Metal Frames and Doors.
   (10) Section 08200 - Wood Doors.
   (11) Section 08400 - Aluminum Entrance Work.
   (12) Section 08500 - Metal Windows.
   (13) Section 10800 - Washroom Accessories.

1.2 SUBMITTALS

A. Submit shop drawings and manufacturer data in accordance with the Conditions of the Contract.

B. All glass and glazing types shall be appropriately identified as per the Contract Documents.

C. Submit two (2) samples of each glass type, 12” x 12” minimum, to the Architect for approval prior to fabrication.

1.3 QUALIFICATIONS

A. Manufacturers and glass type are identified according to the list of types in Part 2, Products.

B. Approved glass manufacturers and fabricators are:

   (1) PPG Industries, Inc.
   (2) Pilkington.
   (3) American-Saint Gobain Corp.
   (4) AFG Industries.
   (5) Technical Glass Products (for FireLite fire-rated glass).
   (6) Old Castle Glass.
   (7) G.E. Lexan (for plastic glazing).
   (8) SAFTI (for SuperLite fire-rated glass).

C. Approved glazing manufacturers are:

   (1) Pecora.
   (2) Tremco.
   (3) DAP.
   (4) Minnesota Mining.
2. PRODUCTS

2.1 Glass types shall be provided in accordance with the following list of types:

   A. **Insulated Glass**: (PPG - 1” Insulated Glass Unit)
      (1) Outer Light: ¼” clear
      (2) Inner Light: ¼” Solarban 60 with coating on surface number 3.
      (3) Air Space: ½” thickness.
      (4) Where tempered glass is noted on the drawings or required by code both lights shall be tempered.

   B. **Tempered Safety Glass**: (Including glass noted as “tempered” on the drawings)
      (1) Clear - thickness ¼”

   C. **Fire Rated Glass**:
      (1) Twenty (20) minute rated doors: Fireglass 20 (20 minute rating), ¼” thick, clear impact resistant glass. Install in UL approved assemblies rated as specified for the particular door type or as noted on the details. Super Lite products are an acceptable manufacturer when meeting and/or exceeding the specified product.
      (2) Forty-Five (45) minute and sixty (60) minute rated (doors and borrow lights): Firelite NT (up to 180 minute rating), ¼” thick, premium finish, clear impact resistance glass. Install in UL approved assemblies rated as specified for the particular door or borrow light types of as noted on the details. Super Lite products are an acceptable manufacturer when meeting and/or exceeding the specified product.

   D. **Mirror Glass**: No. 1 quality ¼” float glass, copper protected, guaranteed five years against silver spoilage; edges ground and beveled.
      (1) Stainless steel Type 304 rolled formed frame with concealed mounting hardware.
      (2) Drilled for screw anchors at corners and intermediate point in length.

2.2 Glazing compounds shall be as manufactured by Pecora, Tremco, or DAP, and shall comply with Federal Specifications TT-P-781a, Type 1, aluminum gray for metal surfaces or TT-P-791a, Type 1, for wood surfaces.

2.3 Pressure-sensitive tape shall be Minnesota Mining (3M) #EC-1202, Tremco 440, or PTI 606 (Protective Treatments, Inc.) fabric-reinforced ribbon sealer, either 1/16” or ⅛” thick as required to provide tight seal.

3. EXECUTION

3.1 Glazing of all frames shall be in accordance with the Float Glass Marketing Association Glazing Manual (latest edition) and in accordance with the manufacturer’s specifications for glazing and as supplemented herein.

3.2 PROTECTION

A. Provide initial protection as required to protect glazing from damage.

B. Clearly mark large panes of glass with black or white cross of tape or wash-off liquid on inside surface.

3.3 GENERAL

A. Glazing shall not be done in damp or dusty conditions or when air temperature is below 40°F. All rebates shall be clean and dry.

B. All glass sizes shall be determined by field measurements.
C. Glazing compounds shall be delivered to the site in unopened containers bearing the manufacturer's label and shall not be adulterated. Thinning permitted only as recommended by the manufacturer.

D. Each pane shall bear factory label which shall not be removed prior to final cleaning.

E. Care shall be taken to provide for proper expansion of glass in frame.

F. All lights shall be cleaned at interior and exterior surfaces upon completion.

3.4 GLAZING

A. Glass for interior glazing of doors and frames may be set with pressure-sensitive tape in lieu of glazing compounds. Tape shall be so applied as to securely support the glass and prevent rattling. Tape shall not extend beyond edge of glass stop.

B. Remove stops provided under other sections. Solidly bed and back-putty glass, applying compound with sufficient knife pressure to insure complete adhesion. Reset stops, maintaining a ⅛" minimum bed of compound between glass and stop; secure with screws furnished.

C. All panes ¼" or heavier and greater than 20 square feet in area shall be set on lead setting blocks, two per pane. Spacers shall be used to maintain glass alignment.

D. Wood surfaces shall not be glazed until after prime coat has been applied, and the surface is thoroughly dry.

E. Temporary protective coatings shall be removed from aluminum before glazing.

END OF SECTION 08800
1. GENERAL

1.1 SCOPE
A. Provide materials, labor, equipment, and accessories required to complete the cold-formed metal framing and drywall work described in the Contract Documents.
B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01035 - Alteration Work Procedures.
(3) Section 01100 - Reserved Items.
(4) Section 02050 - Demolition.
(5) Section 03100 - Concrete and Cement Work.
(6) Section 04200 - Masonry and Mortar Materials.
(7) Section 05000 - Miscellaneous Metal.
(8) Section 05100 - Structural Steel.
(9) Section 06100 - Carpentry.
(10) Section 06200 - Millwork.
(11) Section 07600 - Sheet Metal.
(12) Section 07840 - Firestopping.
(13) Section 07900 - Caulking and Sealants.
(14) Section 08100 - Metal Frames and Doors.
(15) Section 08331 - Overhead Rolling Doors.
(16) Section 08400 - Aluminum Entrance Work.
(17) Section 08500 - Metal Windows.
(18) Section 09500 - Acoustical Ceilings.
(19) Section 09900 - Painting and Finishing.
(20) Section 10155 - Toilet Partitions.
(21) Section 10260 - Wall Corner Guards.
(22) Section 10400 - Identification Devices.
(23) Section 10500 - Lockers.
(24) Section 10520 - Fire Protection Devices.
(25) Section 10800 - Washroom Accessories.
(26) Section 12300 - Casework (Ready-Made).
(27) Division 15 - Mechanical.
(28) Division 16 - Electrical.

1.2 SUBMITTALS
A. Product data for each type of product.
B. Shop drawings for cold-formed metal framing:

(1) Include layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
(2) Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
(3) For metal studs, provide load charts and manufacturer’s data on partition head to structure connectors showing compliance with the performance requirements.
C. Delegated design submittal for cold-formed metal framing. Delegated design submittal shall be signed and sealed by the qualified professional engineer responsible for their preparation
D. Welding certificates.
E. Product certificates for each type of code-compliance certification for studs and tracks.
1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   (1) Design Loads: As indicated on Structural Drawings.

B. Deflection Limits: Design cold-formed metal framing systems to withstand design loads without deflections greater than the following:
   (1) Exterior Framing - Brick Veneer: Horizontal deflection of 1/600 of the wall height.
   (2) Exterior Framing - Plywood or EIFS Veneer: Horizontal deflection of 1/360 of the wall height.

C. Design framing systems to provide for movement of framing members without damage of overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120° F.

D. Framing sizes and connections indicated on the drawings are minimum requirements. Design framing per structural performance requirements indicated.

E. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
   (1) Upward and downward movement of 3/4”.

F. Cold-Formed Metal Framing (General): Design according to AISI’s “Standard of Cold-Formed Steel Framing - General Provisions”
   (1) Headers: Design according to AISI’s “Standard for Cold-Formed Steel Framing - Header Design”.
   (2) Design exterior non-load bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.4 QUALIFICATIONS

A. Wall panel systems, products and accessories specified refer to products of United States Gypsum Company.

B. In general, products of these manufacturers will be accepted for gypsum board and accessories, when, in the judgement of the Architect, they meet or exceed the requirements specified.
   (1) National Gypsum Company.
   (2) Certainteed.
   (3) Georgia-Pacific.

C. In general, products of these manufacturers will be accepted for metal framing when in the judgement of the Architect, they meet or exceed the requirements specified.
   (1) Dale/Incor.
   (2) United States Gypsum Company.
   (3) Dietrich Metal Framing.
   (4) Unimast Incorporated.
   (5) National Gypsum Company.
   (6) Clark Steel Framing.

D. Professional Engineering Qualifications: A Professional Engineer who is legally qualified to practice in jurisdiction where project is located and who is experienced in providing engineering services of the kind indicated. Engineering Services are defined as those performed for installation of cold-formed metal framing that are similar to those indicated for this project in material, design, and extent.
E. Reference Standards:

(5) All cold-formed metal framing shall comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members", and its "Standard for Cold-Formed Steel Framing - General Provisions".
(6) One hour fire rated partitions, UL Design U419 or U465.
(7) Head of rated walls, UL Design HW-D-0060, HW-D-0061, or HW-D-0118.
(8) Other UL Designs will be considered when submitted as substitutions under the conditions of the Contract.
(9) All drywall assemblies required to be fire rated required by this Contract or the Code Official, shall use UL listed products and be constructed per a UL Design member.

2. PRODUCTS

2.1 GYPSUM WALLBOARD (DRYWALL)

A. Panels (unless noted otherwise): Shall be fire-retardant ⅝" thick, tapered edge, 4 feet wide x the longest practical length, conforming to ASTM C-36, Type "X".

B. Water-Resistant Panels: Water-resistant panels shall be the same size and thickness as panels above. Provide Type "W/R" water-resistant panels where water-resistant wall is required.

2.2 COLD-FORMED METAL FRAMING

A. Cold-formed metal framing shall include but not limited to the following:

(1) Exterior non-loadbearing wall framing
(2) Interior non-loadbearing wall framing
(3) Roof rafter framing
(4) Soffit framing
(5) As noted on the contract documents

B. Steel Studs: Structural studs used for all cold-formed metal framing applications except metal studs and shall be manufacturer's standard C-shaped steel studs of web depths indicated, punched, with stiffened flanges, and as follows:

(1) Minimum base metal thickness: 0.0538 inches (16 gauge) .50 ksi.
(2) Flange width: 1⅝".

C. Metal Studs: Non-structural studs used at interior non-loadbearing wall framing applications and shall be manufacturer’s standard C-shaped steel studs of web depths indicated punched, with stiffened flanges, and as follows:

(1) Minimum base metal thickness: 0.0329 inches (20 gauge) .33 ksi.
(2) Flange width: 1¼".
D. **Slip-Channel:** Manufacturer’s single, deep-leg, U-shaped steel track, unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, as follows:

1. Minimum base metal thickness: 0.0538 inches (16 gauge) .50 ksi.
2. Flange Width: 1” plus the design gap.

E. **Vertical Slide Clips:** Manufacturer’s standard bypass of head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

F. **Structural Tubing:** Conform to ASTM A-500, Grade B.

G. **Miscellaneous Structural Steel Shapes and Plates:** Conform to ASTM A-36.

H. Support framing for exterior metal soffits shall be galvanized ⅞” furring channels at 12” on center fastened to 20 gauge galvanized 2½” steel studs at 24” on center suspended from structure above at 48” x 24” on center with 20 gauge 2½” steel studs. Hangers longer than 6'-0” shall be diagonally braced at 6'-0” o.c. maximum with 20 gauge 2½” studs.

I. Include seismic bracing per sheet A5.1 at all ceiling and soffit framing.

2.3 **ACCESSORIES**

A. **Galvanized Framing Accessories**

1. Furring channels: ⅞” deep x 1¼” face width, 25 gauge.
2. Angle runners: 1½” x ⅞” x 24 gauge.
3. Cold-rolled channels: 16 gauge, ¾” or 1½” deep to suit job condition.
4. Hanger wire: Not less than #8 hanger wire.
5. Tie Wire: Not less than double strand galvanized #16 gauge wire.

B. **Galvanized Trim Accessories**

1. Corner Bead: No. 103 or No. 800.
2. Edge Trim: No. 200 series or No. 800 series.
3. Control Joint: No. 093.

C. **Miscellaneous Accessories**

1. Perimeter Gasket: ½” thick flexible foamed plastic.
2. Screws: As recommended by the manufacturer for material thickness and substrate.
3. Adhesive: As recommended by the manufacturer.
4. Joint and surface finishing products: Perforated tape and ready-mixed compounds; "Durabond" compound for exterior work.
5. W/R joint compound for taped joints and fastener heads and for caulking around pipes and plumbing fixtures penetrating water resistant gypsum board.

3. **EXECUTION**

3.1 **STORAGE AND HANDLING**

A. All materials shall be new, delivered in their original, unopened packages.
B. Store materials protected from the elements as recommended by the manufacturer.
C. During cold weather, maintain the temperature within the building between 55º and 70º F. Adequate ventilation should be provided.
D. Immediately remove all damaged materials from the site.
3.2 INSTALLATION OF DRYWALL

A. All work, including framing, application of gypsum board, and construction of solid gypsum board partitions shall comply with “Recommended Specifications for the Application and Finishing of Gypsum Board”, GA-216-82, published by the Gypsum Association, Evanston, Illinois, and these specifics:

1. Steel studs, metal studs, shaft wall studs and furring channels shall be erected in strict accordance with the manufacturer’s specifications, not more than 16” on center, unless detailed otherwise or required by code.

2. On non-rated partitions the gypsum board shall extend a minimum of 3” above the finished ceiling except where otherwise indicated on the drawings. Where non-rated partitions are indicated on the drawings to extend to the deck above, the entire assembly shall continue up to the deck.

3. On rated partitions the entire assembly shall run continuous from the floor to the deck above. The tops of all walls shall be filled with fire-safing insulation and compound.

4. All rated partitions shall be constructed in strict accordance with the U.L. requirements for the fire ratings indicated on the drawings.

5. Apply corner bead, tape and joint compound to all outside corners and edge trim to all free edges. Also provide tape and joint compound to all interior corners.

6. At all intersections of drywall partitions and dissimilar materials, provide perimeter gaskets and caulk joints.

7. Install control joints (including tape and joint compound) where shown on the drawings from the floor to the ceiling.

8. Install control joints (including tape and joint compound) on both sides of the head and sill of all openings (including, but not limited to; doors, windows, cased openings, borrowed lights, overhead doors, counter doors, etc.). Control joints shall be installed from the head of all openings to 3” above the finished ceiling. Ceiling height door frames may be used as control joints.

9. Install control joints (including tape and joint compound) at all areas of drywall that exceed 30 feet in length. Control joints shall be installed from the floor to 3” above the finished ceiling.

10. Provide control joints at both sides of drywall soffits. Apply tape and joint compound in addition to the control joint.

11. Install sound attenuation blankets where indicated by wall types.

12. Leave caulk joints ready to receive caulking specified under Section 07900, Caulking and Sealants.

13. At suspended ceilings install grid support consisting of 1½” channels at 48” on center on hanger wires not more than 48” on center. Install furring channels on the grid at 16” on center and wire tie in place. The ceiling grid shall be suspended from structural supports. Do not suspend from roof deck construction. The ceiling grillage for short spans may be horizontal studs secured to vertical studs at end secured directly to steel.

14. Use Type W/R (water-resistant) panels for walls in all kitchens, toilet rooms, janitor closets, behind sinks and lavatories and all areas subject to wetness except where otherwise required to be Type “X” panels. Do not use Type W/R panels for ceiling installations.

15. Use Type “X” panels for all interior ceilings.

16. All drywall areas shall be sanded smooth and left ready for painting upon completion of the work.

17. Door Frame Anchorages: Provide double stud framing around all openings.
3.3 PATCH WORK

A. Patch all drywall walls with material to match existing surface, toothed in and tuckpointed where left imperfect after demolition. Use material salvaged from demolition when available or new to match existing.

   (1) Locations where patching is required include the following:

      (a) Where an intersecting wall was removed.
      (b) Where fixtures, accessories, brackets, etc., were removed.
      (c) Where doors or windows were removed.
      (d) Wall penetrations where ductwork, pipe, etc., were required.
      (e) Where directed by the Architect.

3.4 CLEAN UP

A. Remove all debris and surplus materials from work areas.
B. Leave all work clean and ready to receive finish materials.

END OF SECTION 09250
SECTION 09500 - ACOUSTICAL CEILINGS

1. GENERAL

1.1 SCOPE

A. Furnish labor, material, services, and equipment necessary to deliver and install all acoustical tile, trim pieces, and suspension systems specified herein and as indicated on the drawings.

B. Related work specified elsewhere:
   (1) Section 02050 - Demolition.
   (2) Section 06100 - Carpentry.
   (3) Section 07900 - Caulking and Sealants.
   (4) Section 08100 - Metal Frames and Doors.
   (5) Section 09250 - Gypsum Wallboard (Drywall).
   (6) Section 09900 - Painting and Finishing.
   (7) Section 12493 - Window Blinds.
   (8) Division 15 - Mechanical.
   (9) Division 16 - Electrical.

1.2 QUALIFICATIONS

A. Acoustical board shall be as manufactured by:
   (1) Armstrong World Industries, Inc.
   (2) CertainTeed.
   (3) United States Gypsum.

B. All acoustical materials shall meet the requirements of Federal Specifications SS-S-118B, and ASTM E-1264 "Standard Classification for Acoustical Ceiling Products" for Fire Type Class A.

1.3 SUBMITTALS

A. Submit manufacturer's product specification information to the Architect, for all items, according to the conditions of the Contract.

B. Submit two (2) samples of each type of tile (6" x 6") and suspension system (12" long) to be used on this project to the Architect according to the conditions of the Contract.

2. PRODUCTS

2.1 ACOUSTICAL BOARD

A. TYPE "A" TILE (SQUARE-EDGE, LAY-IN, HUMIDITY RESISTANT)

   (1) Armstrong World Industries, Inc. - Fine Fissured RH90.
      (a) Fine Fissured RH90 24" x 48" x ⅝", No. 1729.

   (2) United States Gypsum - Radar Climaplus.
      (a) 24" x 48" x ⅝", No. 2410.

   (3) CertainTeed – Fine Fissured. ⅝".
      (a) Vantage 24" x 48" x ⅝", No. HHF-197.
2.2 SUSPENSION SYSTEMS

A. Exposed Double-Web T-Grid System (Steel)

(1) Grid system shall be an exposed T & T grid type system conforming to ASTM C-635 "Standard Specification for the Manufacturer, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings", intermediate duty.

(2) The following manufacturers and systems are acceptable for use on this project:

(a) Chicago Metallic Corporation (Rockfon) 200/1200 Snap-Grid System.
(b) United States Gypsum Interiors Donn DX System.
(c) Armstrong World Industries Prelude 15/16" System.

(3) Grid system components shall be roll formed, electro-galvanized steel with all members having a baked-on white finish.

(4) Main runners and cross tees shall be 15/16" wide by 1½" high by the longest available practical length.

(5) Angle mouldings (wall angles) shall be 15/16" wide by 15/16" high by the longest available practical length.

(6) Provide 1½" cold-rolled channel grid 4'-0" o.c. maximum as recommended by the ceiling system manufacturer.

(7) Wire hangers shall be No. 12 gauge bright basic wire, minimum.

(8) Provide matching radius corner fillers and other miscellaneous matching accessories as required to complete the installation.

3. EXECUTION

3.1 WORKMANSHIP - GENERAL

A. Installation shall be in accordance with Acoustical Materials Association Installation Recommendations, covering Job Conditions, Preparatory Work, and Installation Techniques, as stated in Bulletin XXXII, dated 1973 and in accordance with ASTM C-636 "Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels".

B. Seismic bracing and/or attachment of the acoustical ceiling system shall be in accordance with the details on the drawings and as required by local ordinances and building codes. Seismic installations shall also be in accordance with the "Guidelines For Seismic Restraint Direct Hung Suspended Ceiling Assemblies" as published by the Ceiling and Interior Systems Construction Association (CISCA), Latest Edition. The suspension ceiling grid system shall comply with ASTM E-580 for seismic bracing.

C. Acoustical ceilings shall be installed only by qualified personnel approved by the manufacturers of the materials.

D. Installation of all framing for suspension of acoustical ceilings is included in this section.

E. Protect previously installed materials and equipment during installation of acoustical treatments.

F. Layout of ceilings shall be carefully considered to conform with structural layout and mechanical and electrical equipment. Layout of board shall be symmetrical, with border units at least one half unit wide where possible.

G. Frame around all openings, walls, partitions, structural members or other equipment items extending above ceiling.

3.2 INSTALLATION OF SUSPENDED CEILING GRILLAGE

A. Installation of suspension systems and acoustical units shall be as recommended by the manufacturer, forming a 24" x 48" grid system for exposed grid suspended directly from structural system. Review type of fastening before installation.

B. Install all angles, "F" moulds, and other miscellaneous trim as required to complete installation.

C. On completion there shall be limited exposed screws or fastening devices.

D. Ceiling system shall not be hung from bulb tees, roof deck, electrical conduit, systems piping or ductwork.
E. Provide matching radius corner filler where exposed grid continues around bullnose and odd-shaped corners.
F. Where ceilings extend up vertical surfaces, vertical grid shall be in register with horizontal.
G. Provide black iron, unistrut system or steel angles as recommended by the manufacturer, where interference with wire tie hanger spacing occurs with ductwork, piping, etc.

3.3 INSTALLATION OF LAY-IN UNITS

A. Board shall be set on flanges of grid system in such a way as to be removable. Use metal clips to retain board on vertical surfaces.
B. Edges or ceilings and around openings shall be finished with angle or channel trim matching grid system.

3.4 CLEAN UP

A. On completion remove from the site all excess materials and debris.
B. Clean board and grid "TEES" of spots and fingermarks and clean adjacent materials soiled by this work.
C. Replace board if soiled condition cannot be corrected.

END OF SECTION 09500
1. GENERAL

1.1 SCOPE

A. Description

(1) The following specification covers the complete painting and finishing of all surfaces throughout the interior and exterior of the building except as otherwise specified in Part 3 - Execution.
(2) Supply all labor, materials, tools, ladders, scaffolding, and other equipment necessary for the completion of this work.

B. Related work specified elsewhere:

(1) Examine the specifications for all other trades and become thoroughly familiar with all of the provisions regarding painting.
(2) All surfaces left unfinished by the requirements of other specifications shall be painted and finished as part of this specification.

1.2 QUALITY ASSURANCE

A. Product Identification

(1) All products shall be in the original labeled containers.
(2) Label shall include:
   (a) Manufacturer's name.
   (b) Type of paint or finish material.
   (c) Color (where applicable).
   (d) Label analysis.
   (e) Instructions for reducing, storing, and handling.

B. Required Submittals

(1) Submit manufacturer's name and the names of specific products for the Architect's approval prior to starting work. Submittal information must identify the finish numbers as specified herein.
(2) Submit color selection swatches to the Architect for color selection.
(3) Samples of colors and textures chosen by the Architect shall be applied to correct surfaces for the Architect's approval.
(4) Each sample shall be 50 square feet minimum.
(5) Samples shall be re-submitted until they receive the Architect's approval.
(6) The Contractor shall not proceed with the work until he has obtained sample approval from the Architect. Unsatisfactory work done without sample approval shall be reworked at no additional cost to the Owner.
(7) The samples shall truly reflect the number of coats specified in Part 2, Products.

C. Required Coats

(1) Colors selected shall be for the final coat. Each preceding coat shall be lighter than the succeeding coat.
(2) The number of coats specified refer to published coverage specifications of Sherwin Williams. Products of other specified manufacturers, which require additional coats for proper coverage and protection, will be accepted if the additional coats are provided at no additional cost to the Owner.
1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver products ready-mixed and in their original manufacturer’s labeled container.
B. Store materials in a single location designated by the General Contractor. The storage location shall be kept neat, clean, and well-ventilated. Remove rags and waste daily and take every precaution to avoid the danger of fire. Store products within the temperature range permitted by the manufacturer.
C. Painting and finishing shall not be done when surfaces are wet, during rainy weather, or when the temperature is below 50° F.

2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. This specification refers to products of Sherwin Williams, except where otherwise noted herein.
B. The other specified manufacturers’ products may be used provided the Schedule of Finish corresponds to the Schedule of Finishes contained in this specification.
C. Materials shall be the products of the following manufacturers:

(1) Benjamin Moore Company.
(2) Cook Paint and Varnish Company.
(3) M.A. Bruder and Sons (MAB).
(4) Glidden (ICI).
(5) Pittsburgh Paint Company.
(6) Porter Paint.

D. Products selected for each coating system on each surface shall be the products of a single manufacturer.

2.2 MATERIALS (GENERAL)

A. Painting and finishing materials shall be products of the highest quality and best grade.
B. Painting and finishing materials such as linseed oil, shellac, turpentine, linseed oil putty, or white lead whiting putty (colored to match finish coat) shall be pure.
C. Synthetic products shall not be used without the permission of the Architect.

2.3 COLORS

A. Bids shall be predicated on the use of three (3) exterior colors and ten (10) interior colors.

(1) Interior colors shall consist of two (2) deep colors and four (4) tints.
(2) Two or more paint materials of identical color shall be considered a single color.
(3) Transparent finishes shall not be considered a color.

2.4 SCHEDULE OF FINISHES

A. Interior Finishes - New Work

(1) The following finishes are referred to on the Room Material Schedule and shall be used as scheduled:

(a) Finish #3: Latex enamel with Satin Luster (for plaster, drywall and concrete masonry walls and ceilings).

1) One coat Sherwin Williams Preprite 400 Interior Latex Primer (plaster and drywall surfaces only).
3) Two coats Sherwin Williams ProMar 200 Interior Latex Eggshell B20W201.

(b) Finish #7: Epoxy for plaster, drywall, concrete, concrete masonry, ferrous metals and galvanized metal.

1) One coat Sherwin Williams Preprie 400 Interior Latex Wall Primer (on drywall and plaster only).
3) Two coats Sherwin Williams DTM Acrylic Primer Finish B66W1 (on ferrous metal and galvanized metal only).
4) One coat Prep-Rite, anchor bond (B51W50) on structural glaze facing tile.
5) Two coats Sherwin Williams Water-based Catalyzed Epoxy Gloss or Semi-Gloss.

(c) Finish #10: Wood (transparent) satin/gloss/dull for all wood including doors, frames, handrails, moldings, and trim, unless noted to be "painted" on schedules, details.

1) One coat Sherwin Williams Paste Filler (for opened-grained wood).
2) One coat Sherwin Williams Wood Classics Oil Stain (match sample or omit for natural finish).
3) Two coats Sherwin Williams Wood Classics Fast Dry Oil Varnish (satin).

(d) Finish #14: Alkyd-Enamel with Low Eggshell luster for primed or factory finished ferrous metal items such as columns, beams, girders, bar joists, decking and lintels, stair stringers, balustrade railings, handrails and structure, mechanical louvers, grilles, registers and diffusers, metal doors and frames, including access doors and exposed piping and conduit, including hangers and fittings.

1) Two (2) coats Sherwin Williams Kem Kromic Universal Primer.
2) One coat Sherwin Williams ProMar 200 Alkyd, Eggshell.
3) Omit primer on factory primed items.

(e) Finish #18: Epoxy dry fall for exposed steel joists, structural steel and duct work.

1) One coat Sherwin Williams Galvite Epoxy Ester Dryfall.
2) One coat Sherwin Williams Promar 200 Alkyd, Eggshell.

B. Interior Finishes - Existing Painted Surfaces in Renovated or Remodeled Work.

(1) Spot prime with material listed under Part 2.4, A. for type of surface.
(2) Two (2) coats of finish coating material listed under Part 2.4, A. for type of surface.

3. EXECUTION

3.1 WORKMANSHIP - GENERAL

A. Employ only tradesmen who are skilled and experienced in the particular painting and finishing work involved.
B. Apply all materials in accordance with the manufacturer's published instructions.
C. Do not exceed the manufacturer's recommended area coverage.
D. Do not thin or adulterate materials, except as recommended by the manufacturer.
E. Installed equipment such as switch covers, hardware, fixtures, and other attached items shall be disconnected and removed by the trade involved before painting and finishing, and reinstalled when directed by the painting and finishing contractor.
F. All painting and finishing materials shall be brushed, rolled, wiped, or sprayed as required and subject to the review of technique and equipment by the Architect.
G. All coats shall be even and complete without runs or other blemishes.
H. Protect all surfaces not scheduled or called out to be painted from drips or overspray. Clean up all errors and repair all damage.
I. All coats must be dry before applying succeeding coats.
J. Back prime all interior and exterior wood trim, paneling, etc.

3.2 REQUIRED INSPECTION AND REPORT

A. Inspect all surfaces to be painted or finished and report all conditions that will adversely affect the execution, permanence, or quality of the work. Report shall be in writing to the General Contractor with a copy to the Architect and shall precede any and all work in this section. Do not proceed until surfaces are suitable for preparation described in Part 3.3. The painting and finishing contractor shall assume responsibility for rectifying unsatisfactory finishes if he does not follow this inspecting and reporting procedure.

3.3 PREPARATION OF SURFACES

A. General
   (1) All surfaces shall be cleaned and all dirt, mortar, concrete, oil, grease, dust, and foreign material shall be removed before application of finish materials.
   (2) If acids are used in cleaning, all traces of acid shall be completely removed or neutralized before painting or finishing.
   (3) Repair defects in surfaces to prevent failures and the re-occurrence of failures.
   (4) Sand surfaces between coats and tack clean to produce a smooth, even finish.

B. Wood Surfaces
   (1) Apply a thin coat of white shellac or sealer to knots and sap spots before priming.
   (2) Fill nail holes, cracks, and seams with putty after first coat or prime coat is dry. Bring putty flush with adjoining surface and sand smooth.
   (3) All exterior and interior concealed and exposed finish woodwork shall be back-primed before installation.

C. Metal Surfaces
   (1) Clean bare metal surfaces thoroughly with benzine or other suitable solvents. Clean rusted surfaces with wire brush or sandpaper before applying paint or finishing.
   (2) Sand or scrape factory primed surfaces to eliminate paint runs, blisters, and ripples.
   (3) Touch-up shop coats of paint with primer where marred.
   (4) Apply a thin coat of white shellac or sealer to tarred pipe before it is primed.

D. Concrete and Masonry Surfaces
   (1) Wash surfaces thoroughly with detergent to remove all traces of form oil, releasing agents, dust, and dirt.
   (2) Allow surface to cure for the paint manufacturer's recommended time before painting and finishing.
   (3) Remove all efflorescence with a thorough washing of a 10% muriatic acid solution. Rinse thoroughly with drinkable water.
   (4) Etch concrete floors scheduled to be painted with 10% muriatic acid solution; neutralized with ammonia water. Rinse thoroughly with drinkable water.

E. Drywall Surfaces
   (1) Spot sand taped joints, if required, and dust clean.
   (2) Spot prime taped joints and heads of fasteners before applying prime coat.
   (3) Touch-up suction spots after priming.
F. Hardware Installation on Existing and New Doors

(1) All door hardware, previously installed, shall be removed so all six sides of the doors may be properly finished as specified. This includes all hinges, closers, panic bars, sound/weather stripping, locksets, hold opens, etc. All hardware shall be re-installed after the door finish is properly cured.

(2) Any new door hardware to be installed shall be installed after the door is finished on all six sides and is properly cured.

(3) If new hardware is required on existing and/or new doors for temporary/construction usage, the door hardware shall be removed so all six sides of the doors may be properly finished as specified. All hardware shall be re-installed after the door finish is properly cured.

3.4 CLEANING

A. Clean all paint spots, runs, or laps from floors, glass, or other surfaces.
B. Remove all rubbish, surplus materials, tools, and equipment from site.
C. Touch up work as required.

3.5 SCHEDULE OF SURFACES TO BE FINISHED

A. The following items shall be painted or finished as specified under Part 2.4, SCHEDULE OF FINISHES:

(1) All interior walls, floors, and ceilings, except as noted on the Room Material Schedule.
(2) All exposed interior wood (Finish #10, except as noted).
(3) All interior and wood trim and millwork shall be back-primed.
(4) All exposed interior piping and conduits and hangers, fittings and accessories (Finish #14) in areas noted on the Room Material Schedule.
(5) All exposed interior pipe covering and insulation (Finish #15) in areas noted on the Room Material Schedule.
(6) All interior exposed ferrous base, primed or galvanized metal surfaces, specifically including structural and miscellaneous iron and steel primed, but not factory finished manufactured items, and exposed mechanical equipment.
(7) All grilles, registers, electrical panels, steel doors and frames, steel windows and frames, etc.
(8) Interior metal handrails and pipe rails including stringers and balusters.
(9) Bumper bollards.
(10) Exposed duct work, except in mechanical spaces.
(11) All reused metal doors, frames, and sidelite frames.
(12) Areas in existing building as indicated on finish schedule.
(13) All exposed gas line piping and supports.
(14) At all existing & new fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions (as indicated on the ceiling plans), the contractor shall include the language “FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS” in 2” high stenciled letters at concealed locations above ceilings. Spacing at each location shall not be more than thirty feet (30’) between stencil locations.
3.6 SCHEDULE OF SURFACES NOT TO BE FINISHED

A. Surfaces

(1) Equipment furnished by the Owner or marked N.I.C. (Not In Contract).
(2) Exposed concrete floors.
(3) Conduit, pipe, and duct work not exposed to view.
(4) Structural steel where concealed by walls or ceiling.
(5) Factory-finished items where so specified.
(6) Aluminum window elements.
(7) All brass, bronze, stainless steel, and chromium plate.
(8) Finished materials such as hardware, toilet partitions, etc.

END OF SECTION 09900
SECTION 09986 - SANITARY WALL PANELS

1. GENERAL

1.1 SCOPE

A. Furnish labor, material, services, and equipment necessary to deliver and install the sanitary wall products specified herein and as indicated on the drawings.

B. Related work specified elsewhere:

(1) Section 03100 - Concrete and Cement Work.
(2) Section 06100 - Carpentry.
(3) Section 08100 - Metal Frames.
(4) Section 09250 - Gypsum Wallboard (Drywall).
(5) Section 09500 - Acoustical Ceilings.
(6) Section 09900 - Painting and Finishing.
(7) Division 15 - Mechanical.
(8) Division 16 - Electrical.

1.2 SAMPLES

A. Actual color samples of each type of material shall be submitted to the Architect.

1.3 QUALIFICATIONS

A. All sanitary wall products shall meet or exceed applicable ASTM testing standards.

1.4 TEMPERATURES

A. Minimum working temperature shall be 70° F.

1.5 DELIVERY AND STORAGE

A. Materials shall be delivered to the project site in the manufacturer’s original unopened containers.

B. Store materials at 70° F minimum temperature for 48 hours before installation.

2. PRODUCTS

2.1 GENERAL

A. All materials shall be best quality, free from cracks, dents, spalls, or other defects.

2.2 MATERIALS

A. Manufacturer

(1) Sanitary wall panels shall be provided by Marlite, 202 Harger Street, Dover, OH, 44622.

B. Wall Panel

(1) Sanitary wall panels shall be Marlite Brand FRP, P-100 FR White, pebble surface.

C. Accessories

(1) Provide all moldings as required; inside corner, outside corner, division trim, edge trim, etc.

(2) Provide manufacturer’s recommendations for adhesives and sealants.
3. EXECUTION

3.1 PREPARATION
A. Inspect all wall systems before starting work and notify Architect, in writing, of all defects.

3.2 CONDITIONING
A. Panels should be opened and allowed to acclimate for 48 hours prior to installation.

3.3 INSTALLATION
A. Install all panels in strict accordance with manufacturer’s installation instructions.
B. All moldings must provide a minimum ⅛” expansion joint to insure proper installation.
C. Use only adhesives recommended by the manufacturer.

3.4 CLEANING
A. Remove from the site all debris that is a result of this work.
B. Upon completion, all wall panels and trim shall be free from damage, defects, scratches, and discolorations. Replace all damaged components to the satisfaction of the Architect.
C. Wipe down panels using a damp cloth and a mild soap solution. Refer to manufacturer’s specific cleaning recommendations.

END OF SECTION 09986
SECTION 10155 - TOILET PARTITIONS

1. GENERAL

1.1 SCOPE

A. Furnish materials, labor, equipment, accessories and services necessary to fabricate, deliver and install the toilet partitions shown on the drawings and specified herein.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01100 - Reserved Items.
   (3) Section 03100 - Concrete and Cement Work.
   (4) Section 05000 - Miscellaneous Metal.
   (5) Section 06100 - Carpentry.
   (6) Section 09250 - Gypsum Wallboard (Drywall).
   (7) Section 09500 - Acoustical Ceiling.
   (8) Section 09900 - Painting and Finishing.
   (9) Section 10800 - Washroom Accessories.

1.2 SUBMITTALS

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract. Shop drawings shall include the locations of washroom accessories.

B. Submit actual color samples to the Architect representing the manufacturers complete line of standard colors.

2. PRODUCTS

2.1 SOLID PHENOLIC PARTITIONS

A. The following manufacturers are acceptable when meeting or exceeding the requirements specified herein:

   (1) Accurate Partitions Corporation.
   (2) Global Steel Products Company.
   (3) Partition Systems (Columbia Partitions).
   (4) General Partition Manufacturing Corporation.
   (5) Knickerbocker Partition Corporation.
   (6) Bobrick.

B. Partitions shall have the following minimum characteristics:

   (1) Style: Floor to ceiling braced.
   (2) Construction: Flush phenolic.
   (3) Core: Resin impregnated kraft paper.
   (4) Panels: ½" thick minimum.
   (5) Doors: ¾" thick minimum.
   (6) Pilasters: ¾" thick minimum.
   (7) Finish: Color and texture selected by the Architect from manufacturer's standard range. Minimum of 18 colors.
2.2 HARDWARE AND FITTINGS

A. All exposed hardware and fittings shall be either:

   (1) Stainless steel.

B. The following hardware and fittings shall be required:

   (1) Top pivot hinges for each door.
   (2) Gravity or spring bottom pivot hinges.
   (3) Concealed or surface mounted door latches with mute and stop for each door. Latches for handicapped accessible compartments shall comply with ADA requirements.
   (4) Coat hook and bumper for each door.
   (5) Provide continuous "T" bar (wall stirrup) brackets at all pilaster/panel connections to the wall.
   (6) Door pulls for each door. Provide two (2) pulls for handicapped accessible compartments.
   (7) Wall stops for out-swinging doors at walls.
   (8) Reinforcing plates, 12 gauge stainless steel, for grab bars and accessories.
   (9) Anti-back-out screws and bolts.
   (10) Floor plinth or shoe for each pilaster shall be stainless steel.

3. EXECUTION

3.1 FABRICATION REQUIREMENTS

A. All partitions and compartments shall be floor to ceiling braced, with 4" minimum pilasters.
B. All pilasters shall be floor to ceiling supported and be adjustable. Wall supported pilasters will not be acceptable at any location.
C. All front pilasters, except for end pilasters, shall be equal in width.
D. Provide cut-outs for partition mounted washroom accessories. Coordinate with Section 10800, Washroom Accessories.

3.2 INSTALLATION

A. All work shall be accurately aligned, plumb, and level.
B. Secure panels to walls, floors, ceilings and overhead framing with approved fasteners for the material encountered.
C. Provide metal and/or wood blocking as required in the walls and ceilings to support the partitions (coordinate with General Contractor).
D. Panels and pilasters shall be secured to wall with a continuous bracket, in addition to floor anchorage.
E. Doors and hardware shall be installed and adjusted to function smoothly.
F. Protect partitions during construction and replace damaged units at no additional cost to the Owner.
G. Thru-bolt all back-to-back connections.

END OF SECTION 10155
SECTION 10260 - WALL CORNER GUARDS

1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, equipment, accessories and services necessary to fabricate, deliver and install the wall corner guards where indicated on the drawings and specified herein.

B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.
(2) Section 01100 - Reserved Items.
(3) Section 06100 - Carpentry.
(4) Section 06200 - Millwork.
(5) Section 07900 - Caulking and Sealants.
(6) Section 09250 - Gypsum Wallboard (Drywall).
(7) Section 09900 - Painting and Finishing.
(8) Section 12300 - Casework (Ready-Made).

1.2 SUBMITTALS

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract.

B. Submit actual color samples to the Architect representing the manufacturer's complete line of standard colors.

1.3 QUALIFICATIONS

A. Products specified herein refer to the products of the Pawling Corporation.

B. Products of the following manufacturers will also be acceptable when meeting or exceeding the requirements of the specified products:

(1) Balco, Inc.
(2) Construction Specialties, Inc. (Acrovyn).
(3) Institutional Products Corporation (IPC).
(4) MM Systems Corporation.
(5) Korogard.

2. PRODUCTS

2.1 WALL CORNER GUARDS (SURFACE MOUNTED VINYL)

A. Wall corner guards shall be Pawling Corporation Model CG-10 (3") with the following minimum characteristics:

(1) Aluminum retainer fabricated from 6063-T5 alloy.
(2) Rigid vinyl cover 0.093 inch thick minimum.
(3) Molded top and bottom caps, color to match cover.
(4) Length shall be 4'-0", mounted above resilient base.
(5) Colors will be selected by the Architect from the manufacturer's complete line of standard colors.
3. EXECUTION

3.1 GENERAL

A. Wall corner guards shall be provided on **ALL** drywall exterior corners as indicated on the drawings.
B. Field verify and review the locations of the wall corner guards with the Architect prior to installation.
C. Wall corner guards shall be installed on the wall directly above the resilient base material.
D. Wood blocking shall be provided in the wall for anchorage of the aluminum retainer.
E. Wall corner guard installation shall be as recommended by the manufacturer and as specified herein.

END OF SECTION 10260
SECTION 10400 - IDENTIFICATION DEVICES

1. GENERAL

1.1 SCOPE

A. Furnish labor, materials and equipment to fabricate and install all identification devices shown and specified in the Contract Documents. Refer to Sheet A6.5 for Schedule of Identification Devices.
B. Related work specified elsewhere:

(1) Section 01000 - General Provisions.

1.2 SUBMITTALS

A. Specifications: Submit product specifications in accordance with the conditions of the Contract.
B. Color Samples: Submit full line of standard color samples for material color selection by the Architect, in accordance with the conditions of the Contract.
C. Submit one (1) full size sample sign of type, style and color specified (if applicable) including method of attachment.

1.3 QUALIFICATIONS

A. Products specified herein refer to products of Mohawk Engraving Co., unless noted otherwise.
B. Products of the following manufacturers are approved when meeting or exceeding these specifications.

(1) Andco Industries Corporation.
(2) Impact Visual Systems.
(3) Architectural Graphics, Inc.
(4) Kroy Sign Systems.
(5) Allenite.
(6) Bunting Graphics, Inc.
(7) ASI Sign Systems.
(8) Metal Arts.
(9) Best Sign Systems.

C. Products of other manufacturers will be considered when requested in accordance with the Supplementary Conditions.
D. Signage shall consist of Room Number and Room Function to meet the requirements of the Americans with Disabilities Act - 1990 (ADA) and ANSI A117.1 - 1992.

2. PRODUCTS

2.1 PRODUCT TYPES

A. Type One: Molded Plastic Framed

(1) Sign Size: As Detailed.
(2) Type Size: 1”
(3) Corners: 1½” Radius.
(4) Copy Position: Bottom Center.
(5) Letter Spacing: Normal.
(6) Lettering Style: Helvetica Medium, all Upper Case.
(7) Symbol: Handicapped (S6).
(8) Color: Selected by the Architect from the manufacturer’s standard colors.
(9) Mounting: MS, Mounting stand-off, ¼”.
(10) Braille: Provide Braille markings as required by ADA.
3. EXECUTION

3.1 FABRICATION

A. All identification devices shall be of the highest quality for the product specified.
B. All lettering shall be correctly spaced and straight with approved margins.
C. All aluminum work shall have neatly cut joints and miters with undamaged finishes.
D. All identification devices shall comply with the requirements of American with Disabilities Act (ADA).

3.2 MOUNTING

A. Shall be as scheduled on sheet A6.5 and described below:

(1) MS: Mounting stand-off manufactured of ¼" tempered hardboard mechanically fastened to the wall and the sign SA (Silastic Adhesive) mounted to the hardboard.

3.3 INSTALLATION

A. Identification devices shall be installed where scheduled or shown with scheduled mounting technique. (Verify with the Architect prior to installation.)
B. Touch-up or replace all defective work.

END OF SECTION 10400
1. GENERAL

1.1 SCOPE
   A. Letters shall be as shown on the building elevation, Sheet A2.1.

1.2 SHOP DRAWINGS
   A. Submit in accordance with the Supplementary Conditions.

1.3 QUALIFICATIONS
   A. Manufacturers: Aluminum letters shall be as manufactured by A.R.K. Ramos Foundries; comparable products of Waverly are acceptable; other manufacturers will be considered when required in accordance with the Supplementary Conditions.

1.4 SUBMITTALS
   A. Full-size setting and spacing template shall be furnished with letters.

2. PRODUCTS

2.1 LETTERS
   A. Comparable to Andco “Helvetica Medium 2004” flat face, of height detailed, cast aluminum with baked enamel finish, Type A, guaranteed five (5) years; color as selected by Architect.

2.2 FABRICATION
   A. All metals and letters shall be new and of best quality.
   B. All fabrication shall be done in skillful manner in accordance with best shop practices.
   C. Aluminum shall be free from die mark-up, scratches, blisters or other surface blemishes.

3. EXECUTION

3.1 GENERAL
   A. Letters shall be mounted as indicated on elevations.
   B. Method of mounting shall be by means of full threaded stud, set in drilled hole in masonry and secured with epoxy cement.
   C. After installation, all items shall be clean and left in perfect condition, free of discoloration and surface defects.

END OF SECTION 10426
SECTION 10500 - LOCKERS

1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, equipment, accessories and services necessary to fabricate, deliver and install the lockers where indicated on the drawings and specified herein.

B. Related work specified elsewhere:

   (1) Section 01000 - General Provisions.
   (2) Section 01100 - Reserved Items.
   (3) Section 03100 - Concrete and Cement Work.
   (4) Section 05000 - Miscellaneous Metal.
   (5) Section 06100 - Carpentry.
   (6) Section 06200 - Millwork.
   (7) Section 09250 - Gypsum Wallboard (Drywall).
   (8) Section 09900 - Painting and Finishing.

1.2 SUBMITTALS

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract.

B. Submit actual color samples to the Architect representing the manufacturer's complete line of standard colors.

1.3 QUALIFICATIONS

A. Products specified herein refer to the products of Lyon Metal Products, Inc.

B. Products of the following manufacturers will also be acceptable when meeting or exceeding the requirements of the specified products:

   (1) ASI Storage Solutions, Inc.
   (2) Penco Products, Inc.

C. Where indicated on the drawings the locker design and installation shall be in full compliance with the requirements of the Americans with Disabilities Act (ADA).

2. PRODUCTS

2.1 SINGLE TIER LOCKERS

A. Lockers shall be Lyon Metal Products "Quiet" lockers, single tier, 12" x 12" x 72" high.

B. Lockers shall conform to the following minimum characteristics:

   (1) Frame Members: Shall be framed from 16 gauge sheet metal steel. Backs, sides, shelves and tops framed in 24 gauge sheet metal steel. Members shall have return bends on exposed edges.
   (2) Doors: Shall be formed from 16 gauge sheet metal steel with channel edges. Doors shall have standard louvering.
   (3) Shelves: Provide single shelves in all units.
   (4) Hooks: Provide one (1) double-prong ceiling hook and three (3) single-prong hooks per locker.
   (5) Hinges: Shall be 14 gauge steel, five knuckle pin type, welded to frame, riveted to door flange. Provide three (3) hinges per unit.
   (6) Handle and Latch: Handles and latch shall be recessed stainless steel pocket with finger-lift latch. Lockers to have "Quiet" noise reducing rubber cushions. Handle shall accommodate a padlock to be provided by the Owner.
(7) **Trim:** Provide 18 gauge sheet metal steel trim and filler panels where required to complete the installation.

(8) **Number Plates:** Each locker shall be provided with a polished aluminum numbering plate of up to four (4) numbers. Numbering will be assigned by the Architect.

(9) **Sloping Tops:** Where indicated on the drawings, sloping tops shall be 20 gauge sheet metal steel.

(10) **Colors:** The Architect will select the locker colors from the manufacturer's complete line of standard colors. Color shall be bonderized and have a baked-on enamel finish.

(11) **ADA Accessibility:** Provide one wheelchair accessible locker per 100, or part thereof, regular lockers. Provide ADA lockers at locations indicated on the drawings.

### 3. Execution

#### 3.1 General

A. Lockers and benches shall be fabricated, assembled and installed in accordance with the manufacturer's specification and the requirements specified herein.

#### 3.2 Installation

A. All work shall be accurately aligned and securely anchored to adjacent lockers, base, blocking and framing as required.

B. Provide all matching filler and trim required to complete the installation as indicated on the drawings. Members shall be neatly fitted to hairline joinery.

C. Install locker number plates in sequential order as directed by the Architect.

#### 3.3 Protection and Clean Up

A. All work damaged during delivery and installation shall be replaced and the entire installation left in good condition. Minor surface defects may be touched-up on the project site, subject to approval of the Architect.

B. On completion all doors and hardware shall be adjusted for proper operation.

C. Clean all exposed surfaces, including locker interiors, prior to acceptance by the Owner.

END OF SECTION 10500
SECTION 10520 - FIRE PROTECTION DEVICES

1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, equipment, accessories and services necessary to fabricate, deliver and install the fire protection devices where indicated on the drawings and specified herein.

B. Related work specified elsewhere:
   (1) Section 01000 - General Provisions.
   (2) Section 01035 - Alteration Work Procedures.
   (3) Section 01100 - Reserved Items.
   (4) Section 02050 - Demolition.
   (5) Section 03100 - Concrete and Cement Work.
   (6) Section 04200 - Masonry and Mortar Materials.
   (7) Section 05000 - Miscellaneous Metal.
   (8) Section 06100 - Carpentry.
   (9) Section 06200 - Millwork.
   (10) Section 09250 - Gypsum Wallboard (Drywall).
   (11) Section 09900 - Painting and Finishing.

1.2 SUBMITTALS

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract.

1.3 QUALIFICATIONS

A. Products specified herein refer to the products of Larsen's Manufacturing Company.

B. Products of the following manufacturers will be acceptable when meeting or exceeding the requirements of the products specified:
   (1) J.L. Industries.
   (2) Modern Metal Products.
   (3) Potter-Roemer.

1.4 DRAWING COORDINATION

A. Provide specified cabinet and multi-purpose extinguisher where “FEC” is noted on the drawings or details.

B. Provide wall bracket and multi-purpose extinguisher where “FE” is noted on the drawings or details.

2. PRODUCTS

2.1 CABINETS

A. 2½” semi-recessed cabinet, multi-purpose extinguisher only (FEC)

   (1) Style: Gemini Series, Model Number G2409-6R.
   (2) Trim: 2½” rolled edge trim.
   (3) Door style: White acrylic with vertical red letters.
   (4) Finish: White epoxy.
2.2 FIRE EXTINGUISHERS AND BLANKETS

A. Multi-Purpose Dry Chemical

   (1) Ten (10) pound multi-purpose dry chemical, steel cylinder with red epoxy finish. Larsen Model No. MP-10.

2.3 WALL BRACKETS

A. Provide manufacturer’s heavy duty wall bracket with support strap. Bracket shall be sized for the extinguisher specified.

3. EXECUTION

3.1 CABINET FABRICATION

A. Door corners shall be mitered, butt welded, and ground flush and smooth. No exposed screws will be permitted on the exterior face.
B. Frame trim shall have corners mitered and welded. Welds shall be ground flush and smooth before finishing.
C. Doors and trim shall be shipped disassembled from the tub for ease of installation and leveling.

3.2 INSTALLATION

A. Mechanically secure cabinet to wall with manufacturer's approved connectors, suitable to wall type.
B. Install doors and trim and adjust for proper operation.
C. Install fire extinguishers and tag with date entered into service.

END OF SECTION 10520
1. **GENERAL**

1.1 **SCOPE**

A. Furnish and install the washroom accessories as shown on the drawings and specified herein.

B. Related work specified elsewhere:

   1. Section 01000 - General Provisions.
   2. Section 01035 - Alteration Work Procedures.
   3. Section 01100 - Reserved Items.
   4. Section 03100 - Concrete and Cement Work.
   5. Section 04200 - Masonry and Mortar Materials.
   6. Section 05000 - Miscellaneous Metal.
   7. Section 06100 - Carpentry.
   8. Section 07900 - Caulking and Sealants.
   10. Section 09250 - Gypsum Wallboard (Drywall).
   11. Section 09900 - Painting and Finishing.
   12. Section 10155 - Toilet Partitions.
   13. Section 10500 - Lockers.

1.2 **SUBMITTALS**

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract.

B. When color selection is required, submit actual color samples to the Architect.

1.3 **QUALIFICATIONS**

A. Products specified herein refer to the products of Bobrick Washroom Equipment Company. Comparable products, in the Architect's judgement, from the following manufacturers will also be acceptable:


B. Products of other manufacturers will be considered when requested in accordance with the conditions of the Contract.

2. **PRODUCTS**

2.1 **GENERAL**

A. All products shall be chrome-plated brass or Type 302 stainless steel, satin finish.

B. Hand dryers shall have a porcelain finish with the color(s) selected by the Architect from the manufacturer's standard line of colors.

C. All keyed items shall be keyed alike. Provide a minimum of six (6) keys to the Owner.

2.2 **WASHROOM ACCESSORIES**

A. List of Items (Refer to Sheet A6.5, "Schedule of Washroom Accessories").

   1. **Mirror**: B-290 series, size as detailed on the drawings.
   2. **Grab Bars**: (Horizontal 36” straight): B6806 with B2521 mounting kit.
   3. **Grab Bars**: (Horizontal 42” straight): B6806 with B2521 mounting kit.
   4. **Grab Bars**: (Vertical 18” straight): B6806 with B2521 mounting kit.
(5) Mop Strip: B-224, 36” long.
(6) Napkin Disposal: B-254 surface mounted.
(7) Grab Bars (Side and Rear): B-6861 with B-2521 mounting kit.
(8) Shower Curtain Rod: B-207, length as required and Shower Curtain: B-204-2, 42” wide with B-204-1 hooks.
(9) Shower Seat: B-5171, right-hand seat.

3. EXECUTION

3.1 GENERAL

A. Accessories shall be located as shown on the drawings or where directed by the Architect. Refer to the Washroom Accessories Schedule bound with the detail sheets (DA).
B. Care shall be exercised to avoid damage to finish surfaces of accessories and partitions. All damaged areas shall be repaired or replaced to the satisfaction of the Architect at no additional cost to the Owner.

3.2 INSTALLATION

A. Except as otherwise specified, all accessories shall be securely anchored with toggle bolts or "Molly" bolts.
B. Surface-mounted mirrors shall be mounted on concealed, theft-proof hangers, with allen-head set screws at the bottom of the frame.
C. All fastening devices shall be concealed on completion.

END OF SECTION 10800
1. GENERAL

1.1 SCOPE

A. Furnish all material, labor, equipment, accessories and services necessary to fabricate, deliver and install the ready-made casework where indicated on the drawings and specified herein.

B. Related work specified elsewhere:

1. Section 01000 - General Provisions.
2. Section 01035 - Alteration Work Procedures.
3. Section 01100 - Reserved Items.
4. Section 03100 - Concrete and Cement Work.
5. Section 04200 - Masonry and Mortar Materials.
6. Section 05000 - Miscellaneous Metal.
7. Section 05100 - Structural Steel.
8. Section 06100 - Carpentry.
9. Section 06200 - Millwork.
10. Section 07900 - Caulking and Sealants.
11. Section 08700 - Finish Hardware.
12. Section 09250 - Gypsum Wallboard (Drywall).
13. Section 09500 - Acoustical Ceilings.
14. Section 09900 - Painting and Finishing.
15. Section 10400 - Identification Devices.
16. Section 10800 - Washroom Accessories.
17. Division 15 - Mechanical.
18. Division 16 - Electrical.

1.2 SUBMITTALS

A. Submit shop drawings to the Architect in accordance with the conditions of the Contract.

B. Submit actual color samples to the Architect representing the manufacturer's complete line of PVC edging and solid color, patterns and woodgrain plastic laminates.

1.3 QUALIFICATIONS

A. Product numbers shown on the drawings, and products specified herein, refer to the products of LSI Corporation of America.

B. Products of the following manufacturers are also acceptable when meeting or exceeding the requirements of the specified products:

1. Miller Sash and Door.
2. Stevens Cabinet Company.
3. Northern Woodworks Inc.
4. TMI Systems Design Corporation.
5. Custom Wood Specialties, Inc.
6. Precision Millwork Company.
10. Worden Casework.
11. Cabinet Mates, Inc. (CMI)

C. Other ready-made casework manufacturers will be considered when a written request is submitted to the Architect in accordance with the conditions of the Contract. Request for consideration must be accompanied by a sample cabinet and product construction specifications.
D. GUARANTEE

(1) Provide a written warranty. All materials and products shall be guaranteed for five (5) years from manufacturer’s defects and workmanship. Installation shall be guaranteed for one (1) year.

2. PRODUCTS

2.1 MATERIALS

A. Materials for ready-made casework construction shall conform to the following minimum characteristics:

(1) Plastic Laminate acceptable manufacturers:
   (a) WilsonArt.
   (b) Formica.
   (c) Pionite.
   (d) Nevamar.

(2) Vertical Surface High-Pressure Plastic Laminate:
   (a) Grade: NEMA Standard, 0.030" thickness on exposed exterior cabinet surfaces.
   (b) Finish: Comparable to WilsonArt matte.
   (c) Colors: Will be selected by the Architect from the manufacturer’s complete line of patterns, solid colors and woodgrains. Woodgrain on doors, drawers and body shall all run the same direction - vertical.
   (d) Face Panels: Shall be one (1) color.
   (e) End Panels: Shall match face panels.

(3) High-Pressure Plastic Laminate Balancing Sheet:
   (a) Grade: NEMA Standard, thickness equal to surface to be balanced.
   (b) Finish: Textured white.
   (c) All particle board shall be balanced.

(4) Melamine or Polyester Resin Laminate:
   (a) Laminate: NEMA Standard, 8 mil thickness minimum.
   (b) Color: Neutral.

(5) Particle Board:
   (a) Min. 47 lb. density, 8% maximum moisture content.
   (b) Balanced 3-ply construction, no unsurfaced particle board allowed.
   (c) Particle board shall conform to ANSI A208.1, Grade M-3.

(6) Fiber Board:
   (a) Uniform medium density, screw holding, face - 355 lbs, screw holding, edge - 300 lbs, modulus of rupture 4,500 psi, modulus of elasticity 500,000 psi, internal bond 100 psi.
   (b) Fiber board shall conform to ANSI A208.2
(7) Hardboard:
(a) **Reference Standard:** Commercial Standard CS-251.
(b) **Type:** ¼" thick, tempered, smooth both sides.
(c) **Color:** Neutral.

(8) Edging:
(a) 0.020" or 3 mm PVC to be selected by Architect.
(b) **Color:** To be selected by Architect.

(9) Hardware:
(a) **Hinges:** Shall be concealed heavy-duty, metal construction with a manufacturer’s lifetime guarantee. Hinge shall be 170° swinging and self-closing.
   1) **Quantity:** Provide one (1) pair per door up to 48" high. Doors over 48" high shall be fitted with 1½ pair.
(b) **Pulls:**
   1) **Type:** Plastic semi-recessed.
   2) **Color:** Black.
(c) **Standard Drawer Slides, on all drawers except file drawers:**
   1) Shall be self-closing, white epoxy coated, nylon rollers, positive stop, with a loading capacity of 75 pounds minimum.
(d) **File Drawer Slides, on all file drawers:**
   1) Shall be full extension, three-part progressive opening, nylon rollers, zinc plated with a loading capacity of 100 pounds minimum.
(e) **Adjustable Shelf Brackets:**
   1) Manufacturer’s standard.
(f) **Locks:**
   1) Provide manufacturer’s standard lock at **EACH** door and drawer.
   2) All locks shall be keyed alike per room; all rooms keyed separate; all locks master keyed.
   3) Provide six (6) keys per room and six (6) master keys.
(g) **File Hangers:**
   1) Provide metal adjustable file hangers at all file drawer locations.
   2) File hangers shall be similar to "Pendaflex" style.
(h) **Grommets:**
   1) Shall be "LO Series" as manufactured by Doug Mockett and Company.
   2) Size shall be 3" x 6½" oval plastic with the color selected by the Architect.
2.2 GENERAL REQUIREMENTS FOR CABINET CONSTRUCTION

A. Where noted as “ADA” or “Handicapped accessible” or similar, casework shall be in compliance with the Americans with Disabilities Act, Accessibility Guidelines for Buildings and Facilities, 1998.

B. Construction shall be comparable to LSI overlay body style L44 and shall conform to AWI Standards 400-1 through 400-18 for custom grade, flush front.

   (1) All exposed areas and edges shall be covered with plastic laminate and/or PVC of the gauge specified.

   (2) All casework types, including base and wall cabinets, and shelves with EXPOSED INTERIOR SURFACES (i.e. no doors or drawers) shall be surfaced with the appropriate gauge of plastic laminate. NO EXPOSED CABINET LINER WILL BE PERMITTED.

   (3) All plastic laminate surfaces shall receive a balance sheet on the unexposed side, gauge to match the laminate on the exposed side.

   (4) All wall cabinet bottoms, exposed backs and exposed ends shall receive plastic laminate.

   (5) Vinyl base at toe kick is by Flooring Contractor.

C. **Sub-Base:**

   (1) Water resistant lumber or plywood: Continuous 4½" high x ¾" thick minimum, bridged at 2'-0" o.c., separate from cabinet body (no cabinet sides to floor).

D. **Particle board components, minimum thicknesses:**

   (1) Concealed cabinet backs and drawer bottoms: ½" (or ¼" hardboard).

   (2) Base and tall cabinet tops and bottoms, cabinet sides, doors, drawer fronts, drawer spreaders, hang strips, exposed cabinet backs, shelves in closed cabinets 27" or less span: ¾"

   (3) Wall cabinet tops and bottoms, shelves in closed cabinets over 27" span, all shelves in open cabinets: 1"

   (4) Dividers: as detailed or ¾"

E. **Fiber board components, minimum thicknesses:**

   (1) Drawer bodies: ½"

F. **Construction**

   (1) Cabinet backs shall be fully housed into sides, top and bottom, recessed ¼” min. from back, fully glued with hot melt glue.

   (2) Hang rails shall be glued to backs and mechanically fastened to sides. Provide two at base and wall cabinets, three at tall cabinets.

   (3) Drawer fronts shall be applied to separate drawer bodies. Drawer body sides shall be dadoed and glued to front and back. Drawer bottoms shall be fully housed into body, fully glued with hot melt glue.

   (4) Sub-base shall be separate from cabinet body (no cabinet sides to floor).

3. EXECUTION

3.1 STORAGE AND PROTECTION

A. Store under cover in well-ventilated area, protected from extreme temperature and humidity changes.
B. Do not store or install casework until all operations requiring substantial amounts of water are complete and thoroughly dry.

3.2 WORKMANSHIP

A. All casework shall be fabricated to be square, level, plumb, and true.
B. Install casework under supervision of manufacturer's representative with approved carpenters.
C. Install casework level and plumb and securely anchor in place.
D. Cut to fit around pipes, ducts, etc.
E. Scribe and closely fit to adjacent work.
F. Install all items and adjust for proper operation.

3.3 CLEAN UP

A. Remove all cartons, debris, sawdust, and scraps from work areas and store at location directed by General Contractor.
B. Inspect finished installation and repair all damage.
C. Leave work clean and ready for Owner's use. Cover work as required to keep work clean until acceptance by Owner.

END OF SECTION 12300
1.0 GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Contractor provide:

   A. Valves where shown on the Drawings and described herein.

1.2 QUALITY ASSURANCE

A. All equipment and materials shall be new and of first quality. Manufactured products shall be Manufacturer's standard product with specified options but shall not be field or factory modified unless specified.

B. All materials and equipment shall bear the Manufacturer's nameplate or marking with type, size, catalog numbers and ratings as appropriate.

C. Pressure and Temperature Ratings:

1.3 SUBMITTALS

A. Shop Drawings: Not required for A/E review

B. Product Data: Provide manufacturer's product data on all valves

2.0 PRODUCTS

2.1 GENERAL

A. Insofar as possible, valves of the same type to be by the same manufacturer but not to the extent of sacrificing quality specified; intent is to provide most suitable valve for each service.

B. End Styles shall be compatible with piping systems served.

C. Use ball valves exclusively unless otherwise specified.

2.2 POTABLE WATER SERVICE VALVES

A. Ball Valves (2-inch and smaller)

   1. Brass/Bronze Body
   2. Stainless Steel Ball & Stem
   3. Full Port
4. Rated for a minimum 600 PSI CWP.
5. Lead free suitable for use with domestic water.
6. Manufacturer:
   b. Apollo 77FLF-140 Series

B. Swing Check Valves (2-inch and smaller)
1. Horizontal swing type (can be installed in vertical/upflow position), Regrinding type, Y-Pattern
2. Class 125 (125 psi saturated steam)/200 psi CWP
3. Bronze lead free body
4. Bronze lead free disk
5. Threaded ends
6. Renewable seat and disc
7. Suitable for use with domestic water.
8. Manufacturer:
   a. Nibco T-413-Y-LF
   b. Apollo 161T-LF

C. Butterfly Valves (2-1/2" and Larger)
1. Minimum 200 psi rating
2. Ductile Iron Body
3. Lug Type
4. EPDM Liner
5. Aluminum Bronze Disk
6. Standard lever-lock operator
7. Lead free suitable for use with domestic water.
8. Manufacturer:
   a. Nibco LD-2000
   b. Apollo LD141

2.3 NATURAL/LP GAS SERVICE VALVES

A. Ball Valves (3-inch and smaller)
1. Two piece Bronze body ball valve with large port
2. UL listed Gas Shut-off Valve for use with Natural/LP Gas.
3. 600 PSI CWP/250 psig LP Gas
4. Approved Manufacturers
   1. Apollo 80-100 Series or approved equal

3.0 EXECUTION

3.1 GENERAL

A. Valves shall be installed at all points indicated on the Drawings.
B. All valves shall be installed with stems vertical upright to horizontal wherever possible and shall not be installed with stems below horizontal under any condition.
C. Keep valves clear of tube pull spaces and maintenance spaces.
D. Install valves accessible for operation, inspection and repair.
E. Provide globe valve in bypass around control valves.
F. Provide shut-off on each side of control valves.
G. Support valves individually to relieve pipe stress and allow equipment removal.
H. Follow manufacturer’s recommendation for disassembly of valves for end joining method employed.
SECTION 22 05 29
HANGERS AND SUPPORTS FOR PLUMBING PIPING

1.0 GENERAL

1.1 DESCRIPTION

A. Contractor:

1. Provide pipe hangers, supports, concrete inserts and anchor bolts including all metallic hanging and supporting devices for supporting exposed piping.

1.2 REFERENCES

A. American National Standards Institute, ANSI:

1. ANSI B31.1: Power Piping.

B. Manufacturers Standardization Society of the Valve and Fittings Industry, MSS, 1815 North Fort Myer Drive, Arlington, VA 22209.

1. MSS SP-58: Pipe Hangers and Supports - Materials, design and Manufacturer.
2. MSS SP-69: Pipe Hangers and Supports - Selection and Application.

C. Underwriter's Laboratories/Factory Mutual, UL/FM:

1. Provide products UL listed and FM approved.

D. Uniform Plumbing Code

2.0 PRODUCTS

2.1 GENERAL

A. All materials used in manufacturing hangers and supports shall be capable of meeting the respective ASTM Standard Specifications with regard to tests and physical and chemical properties, and shall be in accordance with MSS SP-58.

B. Select matching components sized to exactly fit pipe size for bare piping or to exactly fit around pipe insulation with saddle and shield for insulated piping.

C. Use only one type by one manufacturer for each piping service.

D. Hanger material shall be compatible with the pipe material. Provide copper plated components for copper piping systems.

E. All hangers and supports shall have some form of adjustment available after installation.
F. Acceptable Manufacturers:

1. B-Line Systems, Inc.
2. ITT Grinnell Corp.
3. PHD Mfg.
4. Approved equal

2.2 PIPE HANGERS AND SUPPORTS

A. Suspended single pipes shall be supported by hangers suspended by steel rods from concrete inserts, beam clamps, or ceiling mounting bolts as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Item</th>
<th>Application</th>
<th>MSS Type</th>
<th>Grinnell Type</th>
<th>B-Line Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Adjustable Clevis Hanger</td>
<td>Steel pipe, not subject to expansion or contraction</td>
<td>1</td>
<td>260</td>
<td>B3100</td>
</tr>
<tr>
<td>All</td>
<td>Roller Hanger</td>
<td>Steel pipe, subject to ½” or more longitudinal thermal expansion</td>
<td>43, 41</td>
<td>601, 603</td>
<td>B3110, B3114</td>
</tr>
<tr>
<td>All</td>
<td>Adjustable Ring</td>
<td>Copper Tube</td>
<td>10</td>
<td>CT-99</td>
<td>B3170CT</td>
</tr>
<tr>
<td>All</td>
<td>All Threaded Rod</td>
<td>Hanger Rod</td>
<td></td>
<td>253</td>
<td>B3205</td>
</tr>
<tr>
<td>All</td>
<td>Beam Clamps</td>
<td>C-Clamp with locknuts</td>
<td>23</td>
<td>95 or 86</td>
<td>B351L or B3036L</td>
</tr>
<tr>
<td>All</td>
<td>Riser Clamp</td>
<td>Steel – support vertical piping runs</td>
<td>8</td>
<td>261</td>
<td>B3373</td>
</tr>
<tr>
<td>All</td>
<td>Riser Clamp</td>
<td>Copper – support vertical piping runs</td>
<td>8</td>
<td>CT-121</td>
<td>B3373CT</td>
</tr>
<tr>
<td>All</td>
<td>Pipe Clamps</td>
<td>To provide flexibility in hanger assembly due to horizontal movement</td>
<td>4, 3, 3</td>
<td>212, 216, 295</td>
<td>B3140, B3142, B3144, B3146</td>
</tr>
</tbody>
</table>

2.3 TRAPEZE HANGERS

A. Strut channel trapeze hangers shall be used to support parallel piping runs. Pipe racks or stanchions fabricated with strut channel shall be used in areas of multiple pipe runs. Strut clamps, straps, and rollers shall be used to maintain proper alignment.

1. Strut shall be B-Line B22 or heavier as required or equal.
2. Clamps and straps shall be B-Line B2000 series, B2400 series or equal.
3. Rollers shall be B-Line B218, B219, B379, B479, B3126 or equal.

2.4 STANCHIONS

A. Floor mounted pipes 3” and larger in diameter shall be supported by either cast-in-place concrete supports or adjustable pipe saddle supports. In general, concrete supports shall be used when lateral displacement of the pipe is probable (unless lateral support is provided), and adjustable pipe saddle supports shall be used where lateral displacement of the pipe is not probable.
1. Each adjustable pipe saddle support shall be screwed or welded to the corresponding size base stand. Supporting pipe shall be schedule 40 steel pipe construction. Each base stand shall be secured to the concrete floor by expansion bolts.

2. Adjustable saddle supports shall be B-Line B3093 with B3088T or B3090 with B3088 or equal.

2.5 WELDED STEEL ANGLE BRACKETS

A. Wall or column supported pipes shall be supported by welded steel brackets equal to B-Line B3063 (light duty), B3066 (medium duty) and B3067 (heavy duty) or equal as required for pipe sizes up to and including 20” diameter.

2.6 SADDLES AND SHIELDS

A. Provide properly sized saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping.

B. Types:

1. Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation. Saddles shall be B-Line B3160 thru B3165 or equal.

2. Protection Shields: MSS Type 40 with loc tab; length recommended by manufacturer to prevent crushing insulation. Shields shall be B-Line B3153/B3155 or approved equal.

3. Thermal Hanger Shields:

   a. Constructed of 360’ insert of high density, 100 psi, waterproofed calcium silicate, encased in 360’ sheet metal shield.
   b. Provide assembly of same thickness as adjoining insulation.
   c. Shields shall be B-Line B3380 thru B3384 or equal.

2.7 CONCRETE INSERTS

A. Concrete inserts for pipe hangers shall be, continuous metal or spot inserts designed to be used in ceilings, walls or floors.

1. Continuous concrete inserts shall be used where applicable and shall be used for hanger rod sizes up to ¾” diameter. Inserts to be used where supports are parallel to the main slab reinforcement shall be B-Line B22I, B32I, B52I or equal.

2. Spot concrete inserts shall be used where applicable and shall be used for hanger sizes up to and including 7/8” diameter. Inserts shall be B-Line B2505 thru B2508, B2500, B2501, B3014 or equal.

2.8 SLEEVES

A. Pipes through Floors Where No Plumbing Fixtures are Installed: 18 gauge galvanized steel.
B. Pipes through beams, Walls, Fireproofing, Footings, and Potentially Wet Floors: Schedule 40 steel pipe or 18 gauge galvanized steel.

C. UL Labeled Sleeves: Prefabricated with insulation and fireproofing.

D. Round Ducts: Galvanized steel.

E. Rectangular Ducts: Galvanized steel.

F. Sleeves Through Fire and Smoke Walls: Provide fire caulking in accordance with NFPA 90A to preserve the same fire rating as the partition being penetrated.

G. Size sleeves to allow for expansion movement and to provide for continuous insulation.

H. Contractor Provide: Prefabricated Wall Penetration Seals: Modular mechanical type; interlocking synthetic rubber links filling annuler space between pipe and wall opening.
   1. Manufacturer:
      a. Thunderline Corp.: Link-Seal
      b. Mason Industries: SPS
   2. Bolt and pressure plate fasteners and rubber seal provide watertight seal between pipe and wall.
   3. Seal provides electrical insulation between pipe and wall.

2.9 VIBRATION DAMPENING TUBING CLAMPS (STRUT MOUNTED)

A. For refrigeration, air conditioning, hydraulic, pneumatic and domestic water applications use a vibration-dampening clamp in strut-mounted applications. For copper and steel tubing sizes use B-Line BVT series clamps (Vibra-Clamp) or equal or B-Line series Vibra-Cushion with B2000 series clamps or equal.

2.10 PIPE ALIGNMENT GUIDES

A. Provide factory-fabricated cast semi-steel or heavy fabricated steel; including bolted 2-section outer cylinder and base with 2-section guiding spider bolted tight to pipe.
   1. Size guide and spiders to clear pipe, insulation, and cylinder.
   2. Guide Length: Recommended by manufacturer to allow indicated travel.
   3. Pipe alignment guides shall be B-Line B3281 thru B3287 or equal

2.11 MISCELLANEOUS SUPPORT MATERIALS

A. Metal Framing: NEMA Standard ML 1.

B. Steel Plates, Shapes and Bars: ANSI/ASTM A36.

3.0 EXECUTION

3.1 GENERAL

A. Comply with MSS SP-69 for installation of hangers, supports, anchors, inserts, etc..
B. Install in accordance with manufacturer’s recommendations and local Building Codes.

C. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, and fittings and to support and secure the pipe in the intended position and alignment.

D. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe and personnel contact.

3.2 PIPE HANGERS AND SUPPORTS

A. Install hangers, supports clamps, and attachments directly from building structure complete with inserts, bolts rods, nuts and washers, and accessories.

1. Do not use wire or perforated metal to support piping; pipe support from other piping not permitted.
2. Install hangers with minimum 1/2 inch clear space between finished covering and adjacent work.
3. Place hanger within 1 foot of each horizontal elbow.
4. Use hangers vertically adjustable 1-1/2 inch minimum after piping is erected.

B. Horizontal Soil, Waste, and Storm Pipe Support: Near each hub, with 5 feet maximum spacing between hangers for cast iron pipe.

C. Fire Water Pipe Support: Independent of other piping.

D. Riser Pipe Support: Independent of connected horizontal piping where practical.

E. Prime Coat Finish

1. Prime coat all exposed steel hangers and supports before installation.
2. Hangers and supports in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed, and need be primed, only.

F. Vertical Piping:

1. Support vertical piping at every other floor.

G. Pipe Movement:

1. Install hangers and supports to allow controlled movement of piping systems; to permit freedom of movement between pipe anchors; and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
2. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement is not transmitted to connected equipment.
3. Pipe slopes:
   a. Install hangers and supports to provide indicated pipe slopes.
   b. Do not exceed maximum pipe deflections allowed by ANSI B31.

H. Pipe Guides: Install pipe guides near expansion loop, expansion joints and ball joints, unless indicated otherwise.

I. Electrolysis: Prevent electrolysis in copper tubing support with copper-plated hanger and supports or other recognized industry methods.
J. Steel Joists: Connect all hangers and attachments to bottom chord of all steel joists or beams.

K. Insulated Piping:
   1. Clamps:
      a. Attach clamps, including spacers, to piping with clamps projecting through insulation.
      b. Do not exceed ANSI B31 pipe stresses.
   2. Shields:
      a. Where low-compressive-strength insulations vapor barriers are specified on cold or chilled water piping, install coated protective shields.
      b. For pipe 8 inches and over, install wood insulation saddles.
   3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

3.3 PIPE HANGER AND SUPPORT SPACING

A. Space hangers and supports in accordance with MSS SP-69, local Building Codes and the following schedule, whichever is more stringent:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Rod Diameter</th>
<th>Max. Hanger Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steel Pipe</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 ¼” and smaller</td>
<td>3/8”</td>
<td>8’ oc</td>
</tr>
<tr>
<td>1 ½” &amp; 2”</td>
<td>3/8”</td>
<td>10’ oc</td>
</tr>
<tr>
<td>2 ½” and 3”</td>
<td>1/2”</td>
<td>10’ oc</td>
</tr>
<tr>
<td>4” &amp; 5”</td>
<td>5/8”</td>
<td>10’ oc</td>
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<tr>
<td>6”</td>
<td>3/4”</td>
<td>10’ oc</td>
</tr>
<tr>
<td>8” to 12”</td>
<td>7/8”</td>
<td>10’ oc</td>
</tr>
<tr>
<td><strong>Copper Tube</strong></td>
<td></td>
<td></td>
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<tr>
<td>1” &amp; smaller</td>
<td>3/8”</td>
<td>8’ oc</td>
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<tr>
<td>1 ¼” and 2”</td>
<td>3/8”</td>
<td>10’ oc</td>
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<tr>
<td>2 ½” and 3”</td>
<td>1/2”</td>
<td>10’ oc</td>
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<tr>
<td>4” &amp; 5”</td>
<td>5/8”</td>
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<td>6”</td>
<td>3/4”</td>
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<td>8” to 12”</td>
<td>7/8”</td>
<td>10’ oc</td>
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<tr>
<td><strong>Plastic Pipe</strong></td>
<td></td>
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<tr>
<td>1” &amp; smaller</td>
<td>3/8”</td>
<td>4’ oc</td>
</tr>
<tr>
<td>1 ¼” - 2”</td>
<td>3/8”</td>
<td>4’ oc</td>
</tr>
<tr>
<td>3”</td>
<td>1/2”</td>
<td>4’ oc</td>
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<tr>
<td>4”</td>
<td>5/8”</td>
<td>4’ oc</td>
</tr>
<tr>
<td>6” and larger</td>
<td>3/4”</td>
<td>4’ oc</td>
</tr>
</tbody>
</table>

B. Install additional hangers and supports when supporting additional concentrated loads; including valves, flanges, guides, strainers, expansion joints and at changes in piping direction.
3.4. ANCHORS

A. Install anchors at locations preventing stresses from exceeding ANSI B31; and preventing transfer of loading and stresses to connected equipment.

1. Install anchors at ends of principal pipe-runs and at intermediate points in pipe-runs between expansion loops and bends.
2. Preset anchors to accommodate both expansion and contraction of piping.

B. Fabricate and install anchor by welding steel shapes, plates and bars to piping and structure in compliance with ANSI B31 and AWS.

C. Anchors for Expansion Compensators: Install anchors in accordance with expansion unit manufacturer's recommendations.

   a. Limit movement of piping and forces to maximums recommended by manufacturer for each unit.

3.5 ADJUSTING AND CLEANING

A. Adjust hangers and supports and place grout under supports to bring piping to proper levels and elevations.
1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor:

1. Provide identification for all mechanical systems including but not limited to the following:
   a. Piping
   b. Valves
   c. Pumps

2. Identification shall indicate material being transported and direction of flow.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements:

2. Uniform Federal Accessibility Standards.
3. NFPA 70.
4. NFPA 90A.
5. OSHA.

1.3 REFERENCES.

A. American National Standards Institute (ANSI):


2.0 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. EMED Company, 330 Green St., Box 369, Buffalo, NY, 14240.

B. Seton Name Plate Corporation, New Haven, CT, 06505.

C. W.H. Brady Co. Signmark Division, 727 W. Glendale Ave., P.O. Box 571, Milwaukee, Wisconsin, 53201.

D. National Marker Company, P.O. Box 1659, Pawtucket, RI, 06862.


F. Carlton Industries, Inc., P.O. Box 280, Lagrange, TX, 78945.
2.2 MECHANICAL SYSTEM COLOR IDENTIFICATION

A. Use pipe makers to identify the following:
   1. Domestic Cold Water (CW) Piping
   2. Domestic Hot Water (HW) Piping
   3. Domestic Hot Water Return (HWR) Piping

3.0 EXECUTION

3.1 INSPECTION

A. Inspect equipment to be labeled and ensure that equipment is in proper condition for application of markers.

3.2 INSTALLATION

A. Placement - Provide Identification Markers:
   1. On all exposed covered and uncovered pipes at a minimum of 50 foot intervals.
   2. On all branches and valves.
   3. On both sides of walls where pipes pass through wall.
   4. At changes of flow direction.

B. Ensure that identification markers are proper size and material to properly and clearly identify items as recommended by Marker Manufacturer and in accord with specified regulatory requirements.

3.3 ADJUST & CLEAN

A. Upon completion of the work, examine entire installation. Correct all errors or defects.

B. Remove all surplus materials, packaging, rubbish, and debris resulting from the work and legally dispose of off site.

C. Leave the work area broom clean.
1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor:
   1. Provide insulation on the following piping systems:
      a. Domestic Water Piping (Hot, Cold and Hot Water Return)
      b. Roof Drain Piping

1.2 QUALITY ASSURANCE

A. American Society for Testing and Materials, ASTM:
   a. Flame spread rating: 25 or less, ASTM E84.
   b. Smoke developed rating: 50 or less, ASTM E84.

B. National Fire Protection Association, NFPA:

1.3 SUBMITTALS

A. Shop Drawings: Not required for A/E Review

B. Product Data:
   1. Indicate complete material data, mastics, and adhesives.
   2. List materials proposed for this project and indicate thickness of material for individual services.

1.4 PROJECT CONDITIONS

A. Install adhesives at ambient and equipment temperatures recommended by adhesive manufacturer.

2.0 PRODUCTS

2.1 FIBERGLASS PIPE INSULATION:

A. Insulation:
   1. Fiberglass, heavy density, minimum of 3.7 lbs./cu.ft. density.
   2. One (1) piece rigid molded
   3. K value of 0.23 @ 75F, suitable for temperatures of -40F. to 450F.

B. Jacket:
   1. Factory-applied vapor barrier, all-service type with self-sealing lap and butt strips.
C. Manufacturers:

1. Knauf: Pipe Insulation
2. Manville Corp: J-M Micro-Lok, 650 APT
3. Owens-Corning Fiberglas: One-Piece Fiberglas 25 ASJ/SSL-2

2.2 ELASTOMERIC INSULATION

A. Acceptable Manufacturers

1. Insulation material shall be a flexible, closed-cell elastomeric insulation in tubular or sheet form: APArmaflex, APArmaflex W, APArmaflex SS, or APArmaflex SA. This product meets the requirements as defined in ASTM C 534, “Specification for preformed elastomeric cellular thermal insulation in sheet and tubular form.”

B. General

2. Insulation materials shall have a closed-cell structure to prevent moisture from wicking which makes it an efficient insulation.

3. Insulation material shall be manufactured without the use of CFC’s, HFC’s or HCFC’s. It is also formaldehyde free, low VOC’s, fiber free, dust free and resists mold and mildew.

4. Materials shall have a flame spread index of less than 25 and a smoke-developed index of less than 50 when tested in accordance with ASTM E 84, latest revision. In addition, the product, when tested, shall not melt or drip flaming particles, the flame shall not be progressive and all materials shall pass simulated end-use fire tests.

5. Materials shall have a maximum thermal conductivity of 0.27 Btu-in./h-ft²-°F at a 75°F mean temperature when tested in accordance with ASTM C 177 or ASTM C 518, latest revisions.

6. Materials shall have a maximum water vapor transmission of 0.08 perm-inches when tested in accordance with ASTM E 96, Procedure A, latest revision.

7. The material shall be manufactured under an independent third party supervision testing program covering the properties of fire performance, thermal conductivity and water vapor transmission.

C. Adhesives and Finishes

A. Adhesive shall be the insulation manufacturer's recommended contact adhesive: Armaflex 520, Armaflex 520 BLV or Armaflex HT 625 Adhesive.

B. Insulation finish shall be the insulation manufacturer's recommended finish: Armaflex WB Finish.

C. Accessories such as adhesives, mastics and cements shall have the same properties as listed above and shall not detract from any of the system ratings as specified above.
3.0 EXECUTION

3.1 PREPARATION
A. Before covering, test and approve piping.
B. Entire surface shall be clean and dry at time of installation.
   1. Insulation: dry before and during application.
   2. Finish with systems at operating conditions.

3.2 GENERAL
A. Maintain continuous insulation runs through walls and floors, and at all sleeves and hangers.
B. All fittings, valve bodies, elbows, etc. shall be wrapped with insulation.
   1. Do not insulate unions, flanges, strainers, flexible connections, or expansion joints.
C. Finish insulation neatly at hanger, supports and other protrusions or interruptions.
D. Ensure hangers and cradles are properly installed to avoid crushing insulation.
E. Locate insulation or cover seams in least visible locations.
F. Install protective metal shields and insulated inserts to prevent insulation compression.

3.3 INSTALLATION (ARMAFLEX)
A. Piping:
   1. Install pipe insulation by slitting tubular sections and applying onto piping or tubing. Alternately, whenever possible, slide unslit sections over the open ends of piping or tubing. All seams and butt joints shall be adhered and sealed using Armaflex 520 or 520 BLVAdhesive. When using AP Armaflex SS, only the butt joints shall be adhered using Armaflex 520 or 520 BLVAdhesive. Armaflex HT 625 Adhesive shall be used with HT Armaflex.
   2. Insulation shall be pushed onto the pipe, never pulled. Stretching of insulation may result in open seams and joints.
   3. Tape the ends of the copper tubing before slipping the Armaflex insulation over the new pipes to prevent dust from entering the pipe.
   4. All edges shall be clean cut. Rough or jagged edges of the insulation shall not be permitted. Proper tools such as sharp non-serrated knives must be used.
   5. On cold piping, insulation shall be adhered directly to the piping at the high end of the run using a two-inch strip of Armaflex 520 or 520 BLVAdhesive on the ID of the insulation and on the pipe. All exposed end cuts of the insulation shall be coated with Armaflex 520 or 520 BLVAdhesive. All penetrations through the insulation and termination points must be adhered to the substrate to prevent condensation migration.
6. Sheet insulation shall be used on all pipes larger than 6² IPS. Insulation shall not be stretched around the pipe. On pipes larger than 12² IPS, adhere insulation directly to the pipe on the lower 1/3 of the pipe. On pipes greater than 24² IPS, complete adhesion is recommended.

7. Seams shall be staggered when applying multiple layers of insulation.

B. Valves, Flanges and Fittings:

1. All fittings shall be insulated with the same insulation thickness as the adjacent piping. All seams and mitered joints shall be adhered with Armaflex 520 or 520 BLV Adhesive. Screwed fittings shall be sleeved and adhered with a minimum 1² overlap onto the adjacent insulation. Armaflex HT 625 Adhesive shall be used with HT Armaflex.

2. Valves, flanges, strainers, and Victaulic couplings shall be insulated using Armaflex donuts that shall then be covered with sheet or oversized tubular insulation.

C. Hangers:

1. Support piping system using high density inserts with sufficient compressive strength. The pipe support insulation shall be elastomeric foam with the same or greater thickness than the pipe insulation. All joints shall be sealed with Armaflex 520 or 520 BLV adhesive.

2. Standard and split hangers -- Piping supported by ring hangers shall have hangers insulated with the same insulation thickness as the adjacent pipe. All seams and butt joints shall be sealed with Armaflex 520 or 520 BLV Adhesive. Armaflex HT 625 Adhesive shall be used with HT Armaflex. Ring hangers may be sleeved using oversized tubular insulation. On cold piping, insulation shall extend up the hanger rod a distance equal to four times the insulation thickness. Insulation tape may be used to a thickness equal to the adjacent insulation thickness.

3. Clevis hangers or other pipe support systems -- Saddles shall be installed under all insulated lines at unistrut clamps, clevis hangers, or locations where the insulation may be compressed due to the weight of the pipe. All piping shall have wooden dowels or blocks of a thickness equal to the insulation inserted and adhered to the insulation between the pipe and the saddle. It is highly recommended for continuous insulation protection to use hanger sizes equal to the outer diameter of the pipe plus insulation thickness.

4. Armafix IPH or Armafix NPH can be used to prevent compression of insulation at standard split, clevis hangers or other pipe support systems. To minimize the movement of Armafix, it is recommended that a pair of non-skid pads be adhered to the clamps. In addition, to prevent loosening of the clamps, use of an antivibratory fastener, such as a nylon-locking nut, is also recommended.
3.4 PIPE INSULATION SCHEDULE (Conductivity 0.21 – 0.28): Provide insulation according to the following schedule unless otherwise noted on the drawings.

<table>
<thead>
<tr>
<th>Service</th>
<th>System Temp.</th>
<th>Pipe Size</th>
<th>Minimum Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Hot Water and Hot Water Return</td>
<td>105F-140F</td>
<td>Up to 1-1/4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 ½ and up</td>
<td>1 ½&quot;</td>
</tr>
<tr>
<td>Domestic Cold Water</td>
<td>40-55F</td>
<td>All</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Condensate Drain Piping</td>
<td></td>
<td>All</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>
1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor:

1. Furnish and install domestic/potable water piping system complete with necessary valves, connections, and other appurtenances as required for a complete and proper system.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM B 88, "Standard Specification for Seamless Copper Water Tube"

B. American Society of Mechanical Engineers (ASME)
   2. ASME B16.18, “Cast Copper Alloy Solder Joint Pressure Fittings”
   3. ASME B16.22, “Wrought Copper and Copper Alloy Solder Joint Pressure Fittings”

1.4 QUALITY ASSURANCE

A. Comply with Uniform Plumbing Code latest addition and amendments thereto.

2.0 PRODUCTS

2.1 PIPE

A. Copper meeting the requirements of ASTM B88.

   1. Above-Grade: Type L copper.
   2. Below-Grade or below concrete slab:
      a. 2” and smaller: Type K soft copper

B. Piping sizes shown on the drawings are nominal pipe sizes.

2.2 FITTINGS

A. Cast bronze or wrought copper fittings conforming to ASME B16.18 and B16.22.

2.3 JOINTS/CONNECTIONS

A. Above-Grade

   1. Sweat copper type with 95/5 or 96/4 Tin-Antimony solder or Silvabrite 100 solder.
   2. Use only lead-free solder conforming to ASTM B32.

B. Below-Grade

   1. Brazed using rods and flux suitable for intended service (Do not use rods containing Cadmium).
   2. Joints under slab acceptable only if allowed by local codes.
3.0 EXECUTION

3.1 INSTALLATION

A. Above-Grade
   1. Install piping parallel to building walls at such heights as not to obstruct portion of window, doorway, stairway or passageway.
      a. Where interference develops in field, offset or reroute piping as required to clear such interferences.
      b. Consult Drawings for location of pipe spaces, ceiling heights, door and window openings or other architectural details and report discrepancies to the A/E, before installing piping.
   2. Piping shall be securely hung and anchored, free to expand and contract quietly, without imposing strains on structure, piping, valves, devices, equipment. Piping shall be run parallel or perpendicular to building lines.

B. Below-Grade
   1. Install piping under slabs without joints where possible.
   2. Insulate water piping buried within building perimeter with insulation suitable for below grade application.
   3. Bury water piping six (6) inches minimum below bottom of slab and encase in two (2) inches minimum of sand.

C. Locate cold water lines a minimum of six (6) inches from hot water lines.

D. Connections between dissimilar metals shall be separated by dielectric couplings.

E. Water piping shall vent through fixtures or equipment above or shall have accessible manual air vents at all high points.

F. Water piping shall drain completely through fixtures or shall have accessible drains at low points.

G. All piping installed through fire-rated construction shall be fire caulked.

3.2 FIELD QUALITY CONTROL

A. System Pressure Test – To be completed before pipes are covered.
   1. Water supply system shall be tested and proved tight under water pressure at least 1-1/2 times the system pressure (minimum of 100 psi) for a minimum of 15 minutes.

3.3 CLEANING

A. Sterilize potable water system with solution containing 200 parts per million minimum of chlorine. Valve off and allow sterilization solution to remain for 3 hours.

B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.
SECTION 22 13 16
SANITARY WASTE AND VENT PIPING

1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor

1. Furnish and install sanitary waste and vent piping systems within building and connect to building sewer five (5) feet from outside of building as shown on plans.

2. Perform excavation and backfill required by work of this Section.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)


7. ASTM A 74-98, Specification for Cast Iron Soil Pipe and Fittings

1.4 QUALITY ASSURANCE

A. Comply with the International Plumbing Code, latest edition and amendments thereto.

2.0 PRODUCTS

2.1 SANITARY DRAINAGE AND VENT PIPING

A. Underground and above-ground:

1. Pipe: Schedule 40 polyvinyl chloride (PVC) plastic pipe (Type DWV) meeting requirements of ASTM D 2665 or ASTM D 2949.
   
a. Fittings: Approved for installation with the piping material installed and shall conform to ASTM D 3311 or ASTM D 2665.

b. Joints: A purple primer that conforms to ASTM F 656 shall be applied and the joints solvent–welded in accordance with ASTM D 2855.

B. In Air Plenum:

1. General:

   a. All materials exposed in air plenums must have a Flame Spread Index
(FSI) of 25 or less and a Smoke Developed Index (SDI) of 50 or less as tested in accordance with ASTM E84.

2. Pipe Materials:
   a. No-Hub Cast Iron meeting requirements of ASTM A 74 or ASTM A 888.
   b. Schedule 40 polyvinyl chloride (PVC) plastic pipe (Type DWV) meeting requirements of ASTM D 2665 or ASTM D 2949 (of the self extinguishing type with an average extent of burn not greater than 10 mm and an average time of burn not greater than 20 seconds when tested according to ASTM D 635) covered with Fire Barrier Plenum Wrap 5A+ by 3M or equal.

2.2 STORM DRAINAGE PIPING

A. Underground and above-ground:
   1. Pipe: Schedule 40 polyvinyl chloride (PVC) plastic pipe (Type DWV) meeting requirements of ASTM D 2665.
      a. Fittings: Approved for installation with the piping material installed and shall conform to ASTM D 2665.
      b. Joints: A purple primer that conforms to ASTM F 656 shall be applied and the joints solvent–welded in accordance with ASTM D 2855.

B. In Air Plenum:
   1. General:
      a. All materials exposed in air plenums must have a Flame Spread Index (FSI) of 25 or less and a Smoke Developed Index (SDI) of 50 or less as tested in accordance with ASTM E84.

   2. Pipe Materials:
      a. No-Hub Cast Iron meeting requirements of ASTM A 74 or ASTM A 888.
      b. Schedule 40 polyvinyl chloride (PVC) plastic pipe (Type DWV) meeting requirements of ASTM D 2665 or ASTM D 2949 (of the self extinguishing type with an average extent of burn not greater than 10 mm and an average time of burn not greater than 20 seconds when tested according to ASTM D 635) covered with Fire Barrier Plenum Wrap 5A+ by 3M or equal.

3.0 EXECUTION

3.1 INSTALLATION

A. Grade soil and waste lines within building perimeter as follows:
   1. Pipe less than 2” in diameter: minimum 1/4 inch fall per ft in direction of flow.
   2. Pipe 3” to 8” in diameter: minimum 1/8 inch fall per ft in direction of flow.

B. Install piping with cleanouts installed as follows
   1. Where shown on Drawings and near bottom of each stack and riser.
2. At every 135 degrees of accumulative change in direction for horizontal lines.
3. Every 50 feet of horizontal runs.
4. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.

C. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or syphon condition on water seal.

D. Vent entire waste system to atmosphere. Discharge 14 inches above roof. Join vent lines together in fewest practicable numbers before projecting above roof. Set back vent lines so they will not penetrate roof near edge or valley.

E. Piping shall be securely hung and anchored, free to expand and contract quietly, without imposing strains on structure, piping, valves, devices, equipment. Piping shall be run parallel or perpendicular to building lines.

F. All piping installed through fire-rated construction shall be fire caulked with an approved material.

G. Minimum size of waste piping installed under floor slab on grade shall be 2-inches.

3.2 EXCAVATION AND BACKFILLING

A. Depth of bury of cover over exterior underground piping shall not be less than 4'-0" unless otherwise noted.

B. Contractor shall do excavating required to install his work, including pockets as required for fittings, etc., and after same are in place and tested and approved, he shall replace drives, curbs and remove surplus earth and debris from the premises as directed by A/E.

C. Backfill under concrete and within 5'-0" of same shall be thoroughly compacted sand or small size gravel. All other backfill shall be free of debris, rock, concrete, etc. and settled with water in layers as directed by A/E. No materials except clean sand shall be placed within 6" of any pipe.

D. Excessive excavations, excavations required to reach undisturbed soil, lower trenches, etc., shall be filled with thoroughly water compacted sand or small size gravel to provide adequate bedding and support.

E. Pipe shall be firmly and uniformly bedded throughout its total length on 3" minimum compacted sand or gravel.

F. Backfill shall be 6" minimum compacted sand or gravel on sides and top.

G. No trenches shall be filled until work had been inspected and approved by A/E.

3.3 TESTING

A. Site Tests - After backfilling and compacting is complete but before placing floor slab, conduct tests for leaks and defective work. Notify Architect prior to testing. Fill waste and vent system to roof level with water, 10-foot head of water minimum, and show no leaks for two (2) hours. Correct leaks and defective work.
SECTION 22 16 16
NATURAL/LIQUID PETROLEUM GAS PIPING

1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor:
   1. Furnish and install gas piping and fittings as described in Contact Documents.

1.2 REFERENCES.

A. American Society for Testing and Materials
   3. ASTM D2513-93a, Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings”.

1.3 QUALITY ASSURANCE

A. Qualifications – Welders shall be certified and bare evidence of certification 30 days before commencing work on project. If there is doubt as to proficiency of welder, Contracting Officer may require welder to take another test. This shall be done at no cost to Government. Certification shall be by Pittsburgh Testing Laboratories or other approved authority.

2.0 PRODUCTS

2.1 PIPE & FITTINGS

A. Above-Ground:
   1. Pipe: Black carbon steel, Schedule 40 pipe meeting requirements of ASTM A53.
   2. Joints & Fittings:
      a. 2” and smaller: Joints shall be threaded. Fittings shall be wrought-steel with dimensions and tolerances conforming to ANSI B16.11. Unions shall be wrought steel. Threaded joints shall be made up with thread compound suitable for use with natural/LP gas.
      b. 2 ¼” and larger: welded steel fittings matching pipe as to finish, construction and working pressure. Welding to be done only by certified welders in compliance with current codes.
B. Below-Ground:

1. Pipe & Fittings – Polyethylene pipe and fittings meeting requirements of ASTM D2513.

3.0 EXECUTION

3.1 INSTALLATION

A. Steel pipe installed through air plenums, in walls, and pipes 2-1/2 inches and larger shall have welded fittings and joints. Other steel pipe may have screwed or welded fittings.

B. Install gas cocks on lines serving gas-fired equipment adjacent to equipment, on outside of equipment cabinet, and easily accessible.

C. Do not use flexible pipe connections to gas-fired equipment.

D. Install 6 inch long minimum dirt leg, with pipe cap, on vertical gas drop serving each gas-fired equipment unit.

E. Use fittings for changes of direction in pipe and for branch runouts.

F. Lay underground pipe in accordance with Manufacturer’s recommendations and local gas suppliers regulations and specifications.

3.2 FIELD QUALITY CONTROL

A. Site Tests – Before pipes are buried or concealed from view, test systems at 60 psig for 4 hours and show no drop in pressure. Submit test results to Contracting Officer.
1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor

1. Furnish and install plumbing fixtures as shown on the Drawings and specified herein for a complete and proper installation

1.2 QUALITY ASSURANCE

A. Standards: Any procedure, material or operation specified by reference to applicable standards or codes shall comply with the current or most recent edition. In conflicts between listed standards, the more stringent shall govern.

1. Applicable Standards:
   b. Local plumbing code
   d. International Mechanical Code, latest edition

B. Contractor shall obtain all necessary permits and arrange for all inspections required by State or Local authorities.

C. Materials must be new, in first class condition, of USA make. Work must be done by trained, experienced, skilled journeyman under an approved full time supervisor, with every possible precaution taken by contractor to assure safety of all persons of all categories.

1.3 SUBMITTALS

A. Product Information:

1. Plumbing fixtures and specialties

1.4 GUARANTEE

A. Each entire overall installation, including every special item, device, and part and every specialized system shall be fully guaranteed from standpoint of satisfactory performance, safety, workmanship and material for one year after formal written acceptance by Architect/Engineer (A/E), any unsuitable, unsatisfactory, noisy, ineffective, defective, improperly sized or applied equipment or material, or unacceptable workmanship shall be quickly replaced or modified during guarantee period or any extension thereof, as directed and as approved by A/E in writing.

B. Individual items and systems shall be guaranteed for same period in addition to the above regardless of any limitations of manufacturer's guarantee period.

C. Vapor Barrier covering guarantee - covering on pipe, fittings, devices, unions, etc. must be unconditionally guaranteed to be free of condensation, water logging, water staining, water drip, water accumulation and mildew for one (1) full year after mechanical installation is accepted by A/E. Any such defective work must be completely replaced.
and refinshed when condition is reported to contractor within above guarantee period by A/E without delay or cost to Owner, and guaranteed in same manner for another one (1) full year period.

2.0 PRODUCTS

2.1 FLASHING

A. Openings in roofs shall be flashed as necessary to be compatible with roofing system using approved methods. Disturbed existing piping through roof shall be properly flashed and weather-tight.

2.2 PLUMBING FIXTURES

A. All plumbing fixtures and non-metal accessories shall be white in color, except where shown or specified otherwise.

B. Fixture trim shall be cast brass with polished chrome-plated finish on exposed surfaces, except where shown or specified otherwise.

C. Provide a separate trap with cleanout for each fixture. Fixture traps shall be tubular wall type, minimum 17 gauge with integral cleanout plugs, polished chrome plated finish, except where shown or specified otherwise. Size trap to fit fixture tailpiece. Comply with local plumbing code.

D. Provide an accessible loose key or screwdriver stop in all water supplies to all fixtures.

E. Provide a chrome plated brass escutcheon plate fastened in place for all wall penetrations for exposed connections to fixtures.

F. Each wall hung fixture shall have a suitable wall hanger, bolted to wall and/or fixture; exposed portions of hangers shall match fixture as to finish.

G. Fixtures shall have water, drain, waste, soil, vent and other connections and accessories as required.

H. Each water connection to fixtures shall have an air gap or vacuum breaker as required by local or state departments of health. Water connection sizes are minimums and must be increased to correspond to manufacturer's standards.

I. Each water connection to fixtures: provide pipe air chamber, as close to fixture as possible, extending vertically up, with capped top, as follows:
   - Fixtures - Full size x 12" (min.)
   - Mains - Full size x 24" (min.)

J. Provide additional air chambers, as may be required to assure quiet operation without increase in contract price.

K. Verify fixture locations and coordinate them with architectural designs and other devices and equipment, as approved by the A/E, before roughing in connections.

L. Install all handicapped fixtures to respective ADA Standards requirements.

M. Refer to drawings for schedule of fixtures.
N. Acceptable Manufacturer’s

1. Fixtures: American Standard, Kohler, Toto
2. Carrier: Wade, Zurn, J.R. Smith
3. Flush Valve: Sloan, Zurn, Toto
5. Faucets: Chicago, Elkay, Kohler, Zurn, Sloan
6. Sinks: Elkay, Kohler

3.0 EXECUTION

3.1 PREPARATION

A. Quantities Required and Clarifications:

1. Contractor shall determine quantities required from drawings and job conditions, except that where specifications call for specific quantities, these quantities shall also govern. If there is conflict between quantities called for on drawings and in specifications, greater quantity shall govern.

2. Where an item is specified by a manufacturer’s number, such number is for general information only, and shall be modified by any additional data, size, etc., which may be shown and/or specified. Where there is conflict between number and other data, it shall be contractor’s responsibility to request clarification from A/E.

3. Where clarification is required for any purpose, including discrepancies within written specifications on drawings, or between them, it shall be contractor’s responsibility to request such clarification from A/E at least 7 days before bids are due and in all cases subsequent interpretations or clarifications made by A/E shall be final.

B. Cleaning

1. Piping, conduit, equipment, devices, etc. shall be thoroughly cleaned before being offered for acceptance.

2. The following shall be thoroughly cleaned, or finished out, or blown out before installation is offered for acceptance.
   a. Plumbing equipment, fixtures, devices, etc.

3. Labels, stickers, temporary protection, etc. shall be removed and work shall be provided by contractor without increase in contract price.

C. Permits, Fees, Enlargements, Extensions, Etc.

1. Contractor shall secure and pay for all licenses, assessments, permits; shall pay for inspections required by county, state and local utilities; and shall replace new or present paving, etc. as approved by A/E and all governmental bodies having jurisdiction. All without increase in contract price.
D. Verification of Points of Connection

1. Before submitting his bid, contractor shall visit site to verify all exposed, concealed and buried points of connection as to location, flow, size, type, depth, pressure, elevation, operating characteristics, etc., including but not limited to the following:
   a. Water service and shut-offs.
   b. Sanitary sewer connections
   c. Storm sewer location

2. If contractor finds that any present point or points of connection to existing facilities are incorrectly shown on plans or incorrectly specified, he shall notify A/E in writing at least 7 days before bids are due to be submitted. A/E will issue an addendum to all contractors, calling their attention to revised point or points of connection.

3. If contractor fails to notify A/E in writing as outlined above, it will be assumed that his bid includes everything required to provide proper connections to all present points of connection as they actually exist and will pay for all relocations, replacements, additional runs and extensions, without increase in contract price.

3.2 PIPING INSTALLATION

A. Piping shall be securely hung and anchored, free to expand and contract quietly, without imposing strains on structure, piping, valves, devices, equipment. Piping shall be run parallel or perpendicular to building lines.

B. Connections between dissimilar metals shall be separated by dielectric couplings.

C. Valves, devices, equipment, etc. must be
   1. Accessible for operating, servicing and replacing
   2. Have interior assemblies removable without removing bodies
   3. Be free of all strain or stress.

D. Water piping shall vent through fixtures, or equipment above or shall have accessible vents at all high points. Vent shall be manual air vents. Also, such piping shall drain completely through fixtures, or shall have accessible drains at:
   1. All low points, ¾" or larger
   2. Brass caps or plugs elsewhere.

E. All piping installed through fire-rated construction shall be fire caulked.

F. Soil and Waste Piping
   1. Install new soil and waste lines as indicated and connect to sanitary system as required.
   2. Provide cleanouts throughout the plumbing system where indicated or required by code and the nature of the work.
   3. Make changes in line or grade with the proper fitting.
   4. All vent pipe shall be firmly and uniformly supported throughout its total length using hangers as specified.
G. Vent Piping

1. Minimum venting shall be as shown on the drawings; otherwise, all venting shall comply with the rules of the specified codes.

2. Vent all parts of the soil and waste system to prevent siphonage of traps of plumbing fixtures.

3. Vent pipe sizes may be increased at contractor's option

3.3 EXCAVATION AND BACKFILLING

A. Depth of bury of cover over exterior underground piping shall not be less than 4'-0” unless otherwise noted.

B. Contractor shall do excavating required to install his work, including pockets as required for fittings, etc., and after same are in place and tested and approved, he shall replace drives, curbs and remove surplus earth and debris from the premises as directed by A/E.

C. Backfill under concrete and within 5'-0" of same shall be thoroughly compacted sand or small size gravel. All other backfill shall be free of debris, rock, concrete, etc. and settled with water in layers as directed by A/E. No materials except clean sand shall be placed within 6" of any pipe.

D. Excessive excavations, excavations required to reach undisturbed soil, lower trenches, etc., shall be filled with thoroughly water compacted sand or small size gravel to provide adequate bedding and support.

E. Pipe shall be firmly and uniformly bedded throughout its total length on 3" minimum compacted sand or gravel.

F. Backfill shall be 6" minimum compacted sand or gravel on sides and top.

G. No trenches shall be filled until work had been inspected and approved by A/E.
SECTION 23 05 00
BASIC MECHANICAL REQUIREMENTS

1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor provide:

1. Basic mechanical materials and methods as shown on the Drawings and specified herein for a complete and proper installation.

1.2 SUBMITTALS

A. Product/Catalog Data

1. Submit Manufacturer's catalog data for each manufactured item.
   a. Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
   b. Include name, address, and phone number of each supplier.

B. Shop Drawings

1. Provide schematic control diagrams for each separate fan system, heating system, control panel, etc. Each diagram shall show locations of all control and operational components and devices. Mark correct operating settings for each control device on these diagrams.
2. Provide diagram for electrical control system showing wiring of related electrical control items such as fuses, interlocks, electrical switches, and relays. Provide drawings showing electrical power requirements and connection locations.
3. Provide other shop drawings required by Division 15 trade Sections.

C. Operations and Maintenance Manuals

1. Provide three (3) sets of manufacturers printed information in three (3) ring binders containing information on installation, operation, and maintenance for each piece of equipment supplied.
2. The information shall list any maintenance requirements and time duration between required maintenance.
3. The information shall show all parts and part numbers of available replacement parts for each piece of equipment.
4. A cross-index of material and equipment shall be furnished containing:
   a. An alphabetical listing of material and equipment including manufacturer's name, address and contact person of the local sales representative.
   b. An alphabetical listing of all subcontractors including name, address, contact person, and specific work performed.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies

1. Perform work in accordance with applicable provisions of local Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify A/E in writing of such differences.

B. Identification - Motor and equipment nameplates as well as applicable UL and AGA labels shall be in place when Project is turned over to Owner.

1.4 COORDINATION

A. Coordinate clearances about all mechanical equipment with existing conditions, building structure and other trades to ensure all manufacturers required clearances are met. Reroute and/or relocate all ductwork, piping, conduit, etc. as necessary to accommodate equipment clearances. It shall be the Contractor’s responsibility to ensure that all manufacturers’ required clearances are met.

1.5 WARRANTIES

A. In addition to guarantee specified in General Conditions, guarantee heating, cooling, and plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

B. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record "start-up" date of each piece of equipment on certificate. Include certificates as part of Operation & Maintenance Manual.

C. Provide 2-year parts and labor warranty on all mechanical equipment.

1.5 SYSTEM START-UP

A. Provide manufacturer’s representative to start-up all mechanical equipment and systems and provide start-up report for all mechanical equipment. Start-up report(s) shall be included in the O&M manual.

B. Off-Season Start-up
   1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
   2. Notify Owner 7 days minimum before scheduled start-up.
   3. Time shall be allowed to completely service, test, check, and off-season start systems.
   4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

1.6 OWNER’S INSTRUCTIONS/TRAINING

A. Contractor shall train Owner’s representatives in operation and maintenance of all mechanical equipment and systems.

B. Provide system training to include (but not limited to) such items as the following: modification of data displays and time schedules, alarm and status descriptions, thermostat programming and maintenance schedules. Provide this training to a minimum of three (3) persons.
C. Provide training above in 2 different 2-hour sessions, each on a different day as part of the contract.

D. Training sessions shall be individualized in nature and specific for this project. Generalized “group” sessions involving multiple building operators from non-related facilities will be specifically prohibited.

2.0 PRODUCTS

2.1 NON-FUSED DISCONNECT SWITCHES

A. Unless otherwise specified, provide non-fused disconnect switches for all mechanical equipment supplied under Division 23. Coordinate size with equipment manufacturer.

B. Disconnect switches shall be listed by a Nationally Recognized Testing Laboratory and constructed and tested in accordance with NEMA standards.

C. Acceptable Manufacturer’s
   1. SquareD
   2. Siemens
   3. Cutler-Hammer

3.0 EXECUTION

3.1 GENERAL

A. Site Inspection
   1. Examine premises to understand conditions which may affect performance of work of this Division before submitting proposals for this work.
   2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

B. Drawings
   1. Plumbing, and Mechanical Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
   2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing, and Mechanical Drawings.
   3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

C. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
3.2 INSTALLATION

A. Interface with other Work
   1. Electrical - Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
   2. Testing & Balancing
      a. Put mechanical systems into full operation and continue their operation during each working day of testing and balancing.
      b. Make changes in pulleys, belts, fan speeds, and dampers or add dampers as required for correct balance at no additional cost to Owner.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

3.3 PENETRATIONS

A. Seal all penetrations thru fire-rated construction (i.e. walls, floors, ceilings, etc.). Install firestopping material to seal penetrations through fire rated structures and draft stops.

B. Seal openings through building exterior caused by penetrations of elements of mechanical systems.

3.4 REPAIR/RESTORATION

A. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.

B. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.

C. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

3.5 ADJUSTMENT

A. Properly lubricate equipment before Owner's acceptance.

B. Repair damaged finishes and leave everything in working order.

3.6 CLEANING

A. Clean exposed piping, ductwork, equipment, and fixtures.

3.7 PROTECTION

A. Do not operate equipment used for moving supply air without proper air filters installed.
SECTION 23 05 93
TESTING, ADJUSTING AND BALANCING FOR HVAC

1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor:

1. Test, balance and adjust the following mechanical systems:
   a. Air distribution system: adjust flows to meet specifications at all supply, return, and exhaust diffusers.
   b. Air moving equipment: fans, blowers, hoods, etc.
   c. Instrumentation and control system

1.2 QUALITY CONTROL

A. All test results shall be documented per the previously approved procedure and transmitted to the A/E for review as a requisite for final acceptance and payment. Final inspection shall follow completion and acceptance of the test results.

B. Testing, adjusting, and balancing shall be performed when the system is operating at or near design conditions.

1.3 SUBMITTALS

A. Report:

1. Submit a final report containing all information regarding the proper completion of the project. Submittal shall include, but not be limited to, original flows, final flows, calculations, procedures, results, etc.

2. Identify in the reports each item not complying with the Contract requirements, or obvious maloperation or design deficiencies of the equipment or controls.

3.0 EXECUTION

3.1 AIR SYSTEMS: Test, adjust and balance systems in accordance with the following:

A. Preliminary:

1. Identify and list size, type and manufacturer of all equipment to be tested, including air terminals, rooftop units, and exhaust fans. Inspect all system components for proper installation and operation.

2. Use manufacturers’ ratings for all equipment to make calculations except where field test shows ratings to be impractical.

3. Verify that all instruments are accurately calibrated and maintained.
B. Distribution:
   1. Adjust zones or branch ducts to proper design CFM.

C. Air Terminals:
   1. Identify each air terminal from reports as to location and determine required flow.
   2. Adjust equalizing devices to provide uniform velocity across the inlets of terminals prior to measuring flows.
   3. Make final measurement of air quantity after the air terminal has been adjusted to provide optimal air patterns of diffusion.
   4. Test and adjust each air terminal to within 10% of design requirement.
   5. Test procedure on air terminals shall include comparison of specified FPM velocity and observed velocity, adjustment of terminal, and comparison of specified CFM and observed CFM after adjustment.

D. Fans:
   1. Vary the total air system quantities by adjustment of fan speed.
   2. Damper restriction of system’s total flow may be used only for systems with direct-connected fans (without adjustable pitch blades), provided the systems pressure is less than ½” wg and sound level criteria is met.

E. Traverses:
   1. Except as specifically indicated herein, make pitot tube traverses of each duct to measure the air flow.

F. Traverse Exceptions:
   1. Pitot tube traverses may be omitted provided the duct serves a single room or space and its design volume is less than 1000 CFM.
   2. In lieu of the pitot tube traverse, determine the airflow in the duct by totaling the volumes of the individual terminals served.

G. Duration:
   1. Conduct operating tests of heating and cooling fans, coils, and other equipment for not less than four (4) hours after stabilized operating conditions have been established.
   2. Base standardized capacities on temperature and air quantities measured during testing.

H. Verification:
   1. Prepare summation of readings of observed CFM along with the specified CFM, and verify that duct losses are within range.
3.2 HEATING AND COOLING SYSTEMS

A. General:

1. Adjust heating and cooling systems to provide required quantities to, or through, each component.

2. Measure and document quantities and pressures with calibrated meters.

3. Use venturi tubes, orifices, or other metering fittings and pressure gages to measure flow rates and balance system.

4. Adjust the systems to provide the approved pressure drops through the heat transfer equipment prior to capacity testing.

5. Where flow metering fittings are not installed, determine the flow balance by measuring temperature differential across the heat transfer equipment, and make flow rate calculations based on temperature differential data.

6. Position automatic control valves to full flow through heat transfer equipment prior to testing.

7. Verify design CFM at all units.

3.3 INSTRUMENTATION

A. Make calibration histories of instrumentation used during the procedure available for examination.

B. Have each testing instrument calibrated by an approved laboratory or manufacturer within 12 months prior to the completion of the project.

C. The engineer reserves the right to require instrument recalibration, or use of other instruments and test methodology, where accuracy of readings is questioned.
SECTION 23 07 13
DUCT INSULATION

1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor provide:

1. Fibrous glass insulation wrap on all supply, return, and fresh air duct systems and related fittings located in unconditioned spaces or plenums unless noted otherwise on the Drawings.

1.2 QUALITY ASSURANCE

A. National Fire Protection Association (NFPA)

1. Fire ratings shall be in accordance with NFPA 90A.

B. American Society for Testing and Materials, ASTM

1. Flame spread of 25 or less, ASTM E84.
2. Smoke developed rating of 50 or less, ASTM E84.

1.3 SUBMITTALS

A. Submit product information on all insulating materials and accessories.

2.0 PRODUCTS

2.1 FIBROUS GLASS INSULATION WRAP

A. Material: Fiberglass with an all service factory applied foil/kraft (FRK/FSK) vapor barrier facing.

B. Minimum Density: 0.75 lb/cu. ft.

C. Insulation shall be suitable for use with commercial heating, air conditioning and dual-temperature ducts operating at temperatures from 40°F to 250°F.

D. Acceptable Manufacturers

1. Owens Corning SOFTR Duct Wrap
2. Knauf
3. Johns Manville

2.2 ACCESSORIES

A. Provide staples, bands or wire as recommended by insulation manufacturer for application indicated.

B. Provide cements, adhesives, coatings, sealers and similar compounds as recommended by insulation manufacturer for the application indicated (No asbestos containing materials are allowed).
3.0 EXECUTION

3.1 GENERAL

A. Contractor shall install insulation in accordance with Manufacturer's recommendations.

B. Insulation shall be continuous through walls and floors except where it must be broken to maintain the fire rating of the wall or floor.

3.2 DUCT INSULATION

A. Sheet metal ducts shall be clean, dry and tightly sealed at all joints and seams before applying fiberglass duct wrap insulation.

B. Cover all external portions of the duct with duct wrap insulation. Round spiral ducts shall be the double wall/insulated type.

C. Cut duct wrap to the proper "stretch-out" diameter as specified in the manufacturer's instructions to ensure thermal performance.

D. Remove a two (2) inch piece of insulation from the facing at the end piece of insulation to form an overlapping stapling and taping flap.

E. Install duct wrap insulation with facing outside so that the tape flap overlaps the insulation and facing at the other end of the piece of duct wrap. Adjacent sections of duct wrap insulation shall be tightly butted with the two (2) inch stapling and taping flap overlapping.

F. If ducts are rectangular or square, install so insulation is not excessively compressed at corners.

G. Seems shall be stapled approximately six (6) inches on center with 1/2-inch steel outward clinching staples and sealed with pressure-sensitive tape matching the insulation facing, FRK backing stock or glass fabric and mastic.

H. Seal all tears, punctures and other penetrations of the duct wrap facing with tape or mastic to provide a vapor-tight system.

I. Where rectangular ducts are 24 inches in width or greater, duct wrap shall be secured to the bottom of the duct with mechanical fasteners spaced 18" on center (maximum).

3.3 INSULATION SCHEDULE

<table>
<thead>
<tr>
<th>Intended Service</th>
<th>Installed K-Value</th>
<th>Minimum Thickness (in)</th>
<th>Minimum R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Air Ducts</td>
<td>.27</td>
<td>2.2</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>.25</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Supply and Fresh Air Ducts</td>
<td>.27</td>
<td>2.2</td>
<td>6.0</td>
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<tr>
<td></td>
<td>.25</td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>
1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor provide:
   a. Ductwork, fittings and accessories.
   b. Turning vanes
   c. Volume dampers.
   d. Fire and smoke dampers.

1.2 QUALITY ASSURANCE

A. Design and Installation Standards:
   1. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems
   2. NFPA 90B Warm Air Heating and Air Conditioning Systems
   5. ASHRAE Standards on duct construction.
   6. Underwriters’ Laboratories standard UL 181 requirements for class 1 air duct material

B. Fire and Smoke Rating Standards: ASTM-E84, NFPA 255 and UL 723.

C. Dimensions on Drawings indicate inside dimensions of air flow area. Outside duct dimensions must be increased for internally lined ducts to allow for liner thickness.

1.3 SUBMITTALS

A. Submit ductwork fabrication and installation drawings.

1.4 COORDINATION

A. Installation of ducts shall be coordinated with the building structure, lighting fixtures, piping, conduit, reflected ceiling plans and other trades as necessary.

2.0 PRODUCTS

2.1 SHEET METAL DUCTWORK

A. Material
   1. All ducts unless specified otherwise shall be constructed from sheets or rolls of G60 or better galvanized steel ASTM-A525.
   2. Exhaust ducts in shower rooms or other wet areas shall be constructed from 3003-H14 series aluminum. Shower or wet area exhaust where tied to general exhaust shall be aluminum from the air device to the point indicated on the Drawings.
B. Construction

1. All ductwork unless specified otherwise shall be constructed of gauges and reinforcement in accordance with SMACNA HVAC Duct Construction Standard as follows:
   a. Rectangular duct: Table 1-5 (2” w.g. static pressure)
   b. Round duct: Table 3-2 (2” w.g. static pressure)

2. Where local code requires gauges heavier than required by SMACNA then the local code shall govern.

3. All ductwork shall be neatly constructed and stiffened on the outside surfaces where necessary to prevent vibration or buckling. Panels in all ducts 12” and larger shall be cross-broken. All ducts, housings, etc. shall be fabricated as detailed on the Drawings and in the SMACNA HVAC Duct Construction Standard.

C. Longitudinal Joints

1. Unless specified otherwise, all rectangular duct longitudinal joints shall be “Pittsburgh Lock”.

2. Unless specified otherwise, all round and oval ducts 12-inches and larger shall have spiral seams or continuously welded longitudinal seams. Snap Lock seams may be used for round ducts under 12-inches.

D. Transverse Joints

1. All transverse joints in rectangular ductwork 18-inches and larger shall be made by a flanged duct connection system. Transverse joints in rectangular ductwork smaller than 18-inches shall be made in accordance with SMACNA suitable with the pressure class.

2. All transverse joints in round and oval ductwork 18-inches and larger shall be made by a round/oval flanged duct connection system. Transverse joints in round and oval ductwork smaller than 18-inches shall be made by beaded sleeve joints.

3. The rectangular flanged duct connection system shall consist of roll-formed flanges, corner pieces, gaskets and cleats described as follows:
   a. Flanges attach to the duct wall and have integral mastic, which allows the flange to seal itself to the duct.
   b. Corner pieces are used to add rigidity to the flange, hold the ductwork together and provide a sealing surface for the gasket.
   c. The gasket serves as a seal between the flanges.
   d. The cleat insures even compression of the gasket along the length of the flange.

4. Approved Manufacture’s
   a. Ductmate Industries, Inc. or approved equal.

E. Fittings

1. Fittings shall be in accordance with Section II of SMACNA HVAC Duct Construction Standard.
2. Radius elbows without vanes: Radius Ratio (R/W) shall be 1.5 or greater.

3. Radius elbows with vanes:
   a. R/W = 0.75 to 1.0: Provide 3 vanes in elbow
   b. R/W = 1.0 to 1.25: Provide 2 vanes in elbow
   c. R/W = 1.25 to 1.5: Provide 1 vane in elbow
   d. Dual Radius: Per Figure 2.5, SMACNA HVAC Duct Construction Standards.

4. Where square elbows are indicated or required, provide with turning vanes.

5. Branch Connections:
   a. Round: conical or 45 degree conical
   b. Rectangular: 45 degree entry type. Spin in fittings are not acceptable.

6. Provide necessary transition pieces and duct collars to make connections to ductwork and from neck sizes shown on the Drawings.

2.2 FLEXIBLE DUCTWORK

A. Constructed with smooth inner liner supported on aluminum or steel helix, 1" thick fiberglass blanket insulation with maximum thermal conductivity of 0.23 BTU/HR-SQ FT-F at 75 F. mean temperature, and fiberglass reinforced metalized film vapor barrier outer jacket.

B. Flexible duct used in return air ceiling plenums must be clearly labeled "Class 1" every four feet.

C. Maximum length of flex duct for runouts shall be ten (10) feet unless otherwise noted on the Drawings. Flex ducts shall be routed to minimize total length and have no kinks or sharp bends. Flex ducts may not pass through smoke or fire rated walls, floors or ceilings.

D. Approved Manufacturers
   a. Thermaflex M-KE
   b. Acme Manufacturing Co.
   c. CertainTeed Corp.

2.7 DUCT HANGERS AND SUPPORTS

A. Duct systems shall be installed with support systems as indicated in Tables 4-1 to 4-3 and Figures 4-1 to 4-8 of SMACNA HVAC Duct Construction Standard, Section IV and additionally as required to maintain alignment.

B. Horizontal ducts shall have a support within two (2) feet of each elbow and within four (4) feet of each branch intersection.

2.8 DUCT SEALANT

A. Duct sealant shall be flexible, water based, adhesive sealant designed for use in 2" static pressure systems. Sealant shall be U.L. Listed and conform to ASTM E84.

B. All supply ductwork unless specified otherwise shall be SMACNA's seal class A.

C. All return, exhaust and supply ductwork downstream of terminal units shall be SMACNA's seal class B.
D. Approved Manufacturer's
   a. Ductmate PROseal
   b. United McGill AirFlow Corp. Uni-Mastic
   c. Duro-Dyne DSW

2.9 TURNING VANES

A. Double vane, runner Type 2, 2-inch vane radius, 2 1/8-inch vane spacing and minimum 26 GA. where indicated on the drawings or specified herein.
   a. For widths over 60-inches, install vanes in 2 or more sections or use tie rods to limit the unbraced vane length.

B. Rectangular mitered elbows shall have double thickness turning vanes for elbows from 60 degrees through 90 degrees.

C. Acceptable Manufacturers
   a. Titus
   b. Aero-Dyne
   c. Airsan

2.10 ACCESS DOORS

A. Provide access doors at fire, smoke, or duct mounted damper locations and where indicated on the Drawings.

B. Access doors shall permit easy visual inspection of fire and/or smoke dampers.

C. Provide door handles and gasket seals on all doors.

D. Acceptable Manufacturers
   a. United McGill AirFlow Corp.
   b. Air Balance Inc./American Warming & Ventilating Co.
   c. PCI Industries/Potterff
   d. Ruskin

2.11 DAMPERS

A. Manual Volume Dampers (Round)
   1. Provide manual volume dampers at all runouts and where indicated on the drawings.
   2. Factory built and assembled, butterfly type dampers with circular blade mounted to shaft and self-lubricating nylon or stainless steel sleeve. Minimum 14 GA galv. steel frame, 16 GA galv. Steel blade and ½-inch diameter shaft.
   3. Provide with 2-inch standoff bracket to accommodate thickness of duct insulation.
   4. Acceptable Manufacturers
      a. Greenheck Model MBDR-50 ROUND or approved equal.

B. Manual Volume Dampers (Rectangular)
   1. Provide manual volume dampers at all runouts and where indicated on the
drawings.

2. Factory built and assembled damper with a single rectangular blade mounted to a shaft and self-lubricating nylon or stainless steel sleeve. Minimum 22 GA galv. steel frame, 20 GA galv. Steel blade and ½-inch diameter shaft.

3. Provide with 2-inch standoff bracket to accommodate thickness of duct insulation.

4. Acceptable Manufacturers
   a. Greenheck Model MBD-10 or approved equal.

C. Backdraft Dampers
   1. Aluminum, counterbalanced, gravity operated

   2. Acceptable Manufacturers
      a. Ruskin Manufacturing Co.
      b. Air Balance, Inc
      c. PCI Industries/Pottorff

D. Fire Dampers
   1. UL Labeled, 1 ½ hour rated (unless otherwise indicated), 165 degree F fusible link.

   2. Provide where indicated and where required by NFPA.

   3. Multiblade type for openings over 12 x 12 inches, single blade for openings 12 x 12 or less. Blades shall be out of air stream.

   4. Acceptable Manufacturers
      a. Ruskin Manufacturing Co. Model IBD
      b. Air Balance, Inc Model 119
      c. PCI Industries/Pottorff

E. Smoke Dampers
   1. Dampers and actuators shall be UL listed and labeled as an assembly for use in smoke control systems under UL 555 and 555S

   2. Provide smoke dampers where indicated on the Drawings in ductwork adjacent to smoke partition (not in wall) with actuator in accessible location and visible for inspection.

   3. Parallel or opposed blade type with blades hinged together for operation in unison and bearings arranged for automatic operation.

   4. Single thickness type minimum 16 GA steel, double thickness type minimum 18 GA steel.

   5. Actuator: factory installed two position type, 120V, spring return fail closed and UL listed at 250 degrees F.

   6. Acceptable Manufacturers
      a. Ruskin Manufacturing Co. Model SD36 (Class II) and SD37 (Class I)
      b. Air Balance, Inc Model
F. Combination Fire-Smoke Dampers

1. May be used in lieu of separate fire and smoke dampers.

2. Dampers and actuators shall be UL listed and labeled as an assembly for use in smoke control systems under UL 555 and 555S

3. UL555 fire rating: 1 ½ hour (unless otherwise indicated).

4. Provide where indicated on the Drawings in ductwork adjacent to smoke partition (not in wall) with actuator in accessible location and visible for inspection.

5. Parallel or opposed blade type with blades hinged together for operation in unison and bearings arranged for automatic operation.

6. Firestat (UL listed)
   a. Lock damper in closed position at 212 deg F duct temperature
   b. Provide override function to operate damper in a smoke control operation.
   c. Provide two (2) damper position indicator switches to provide remote indicating damper blade position.
   d. Firestat and two (2) position indicator switches shall be capable of interfacing with fire alarm system.

7. Acceptable Manufacturers
   a. Ruskin Manufacturing Co. Model FSD36 (Class II)
   b. Air Balance, Inc Model
   c. PCI Industries/Pottorff

3.0 EXECUTION

3.1 INSTALLATION OF DUCTWORK

A. Ductwork shown on drawings shall be considered as diagrammatic and may not be shown in its actual location for clarity. The drawings are not intended to indicate all offsets or transitions as required for actual installation. Ductwork sizes indicated are inside dimensions. Where dimensions are altered to avoid interferences, conflicts or clearance difficulties, the revised size shall provide the same air handling characteristics and be noted on the final As-Built drawings.

B. Install ductwork in accordance with SMACNA recommendations. Support directly from structure.

C. Coordinate duct locations with all affected Contractors before beginning installation.

D. Conceal ductwork in finished spaces unless indicated otherwise.

E. Install test holes in locations required for air balancing.

F. All joints and seems shall be sealed with tape or mastic.
3.2 INSTALLATION OF FIRE AND SMOKE DAMPERS
   A. Install in accordance with Manufacturer’s instructions.
   B. Seal smoke, fire and combination fire-smoke dampers at wall or floor opening and between damper and sleeve or duct around one side of damper’s downstream face.

3.3 INSPECTION
   A. Inspect and test ductwork before insulation is applied. Repair or replace damaged duct materials. Seal visible holes. Do not rely on insulation to seal holes.
SECTION 23 34 00
EXHAUST FANS

1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor provide:
   1. Exhaust fans where shown on the Drawings and specified herein.

1.2 QUALITY ASSURANCE

A. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

B. Each fan shall bear a permanently affixed manufacturer’s engraved metal nameplate containing the model number and individual serial number for future identification.

1.3 SUBMITTALS

A. Submit product information for all fans.

2.0 PRODUCTS

2.1 DIRECT DRIVE DOWNBLAST CENTRIFUGAL EXHAUST FANS

A. General Description:
   1. Downblast fan shall be for roof mounted applications
   2. Performance capabilities up to 14,500 cubic feet per minute (cfm) and static pressure to 2.75 inches of water gauge
   3. Fans are available in twenty sizes with nominal wheel diameters ranging from 8 inches through 30 inches (071 - 300 unit sizes)
   4. Maximum continuous operating temperature is 180 Fahrenheit (82.2 Celsius)
   5. Each fan shall bear a permanently affixed manufacturer’s engraved metal nameplate containing the model number and individual serial number.

B. Wheel:
   1. Constructed of [aluminum] [composite]
   2. Non-overloading, backward inclined centrifugal
   3. Statically and dynamically balanced in accordance to AMCA Standard 204-05
   4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.

C. Motors:
   1. Electronically Commutated (EC) Motor
      a. Motor enclosures: Open type
      b. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors.
      c. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.
      d. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
      e. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.
f. Motor shall be a minimum of 85% efficient at all speeds.

D. Housing:
1. Motor cover, shroud, curb cap, and lower windband shall be constructed of heavy gauge aluminum
2. Shroud shall have an integral rolled bead for extra strength
3. Shroud shall be drawn from a disc and direct air downward
4. Lower windband shall have a formed edge for added strength
5. Motor cover shall be drawn from a disc
6. All housing components shall have final thicknesses equal to or greater than preformed thickness.
7. Curb cap shall have pre-punched mounting holes to ensure correct attachment
8. Rigid internal support structure
9. Leak proof

E. Housing Supports and Drive Frame:
1. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators

F. Vibration Isolation:
1. Rubber isolators
2. Sized to match the weight of each fan

G. Disconnect Switches:
1. NEMA rated: 3R
2. Positive electrical shut-off
3. Wired from fan motor to junction box installed within motor compartment

H. Options/Accessories:
1. Birdscreen:
   a. Material Type: Aluminum
   b. Protects fan discharge
2. Roof Curbs:
   a. Mounted onto roof with fan
   b. Material: [Aluminum] [Galvanized]
   c. Insulation thickness: [1] [1.5] [2] inches
3. Curb Seal:
   a. Rubber seal between the fan and the roof curb
4. Dampers:
   a. Type: Gravity
   b. Prevents outside air from entering back into the building when fan is off
   c. Balanced for minimal resistance to flow
   d. Galvanized frames with prepunched mounting holes

I. Acceptable Manufacturer’s
1. Greenheck Model G
2. Carnes
3. Cook

3.0 EXECUTION

3.1 GENERAL

A. Install exhaust fans according to manufacturer’s recommendations at the locations show on the Drawings.
1.0 GENERAL

1.1 WORK INCLUDES

A. Contractor provide:
   2. Ceiling diffusers.

1.2 QUALITY ASSURANCE

A. Comply with the following applicable Standards:
   1. NFPA 90A Installation of Air Conditioning and Ventilating Systems
   2. NFPA 90B Warm Air Heating and Air Conditioning Systems

1.3 SUBMITTALS

A. Submit product information for all air distribution devices.

2.0 PRODUCTS

2.1 GENERAL

A. Finishes: Furnish all air distribution devices with prime coated and white baked enamel finish coat unless specified otherwise.

2.2 CEILING SUPPLY AIR DIFFUSER

A. Drywall/Hard Ceiling:
   1. Ceiling diffuser shall be surface mount; square, 4-way throw plaque face with fixed discharge unless noted otherwise. Finish shall be white to match ceiling. See Plans for diffuser and neck sizes.

   2. Acceptable Manufacturers
      a. Titus Model TDC
      b. Carnes
      c. Price
      d. Nailor

B. Lay-in Ceiling:
   1. Ceiling diffuser shall be square, 4-way throw plaque face with fixed discharge unless noted otherwise. Diffuser model shall be matched to the specific lay-in ceiling type (standard, tegular, etc.). Finish shall be white to match ceiling. See Plans for diffuser and neck sizes.
2. Acceptable Manufacturers
   a. Titus Model TDC
   b. Carnes
   c. Price
   d. Nailor

2.3 CEILING RETURN AIR REGISTER
   A. Install perforated ceiling register at the locations shown on the drawings. Finish shall be white to match ceiling. Ceiling register shall have a Noise Criteria (NC) < 20 unless otherwise noted.
   B. Acceptable Manufacturers
      1. Titus PAR or equal

2.4 SPECIALITY GRILLES AND DIFFUSERS
   A. As scheduled on the drawings.
   B. Acceptable Manufacturers
      1. Titus
      2. Carnes
      3. Price
      4. Nailor

3.0 EXECUTION

3.1 GENERAL
   A. Coordinate installation of air distribution devices with the building structure, lighting fixtures, piping, conduit, reflected ceiling plans and other trades as necessary.

3.2 INSTALLATION
   A. Suspend ceiling air devices from structure on wire hangers or from rigid ductwork. Finished ceiling must not be used to support air distribution devices.
   B. Verify compatibility of air devices with specific ceiling types.
   C. All ductwork visible through any return or exhaust air grilles shall be painted black.

3.3 INSPECTION
   A. Inspect air devices for scratches and dents after installation. Repair dents and touch up scratches. If damage is still visible replace device.
SECTION 23 74 14
SINGLE ZONE ROOFTOP UNIT

1.0 ROOFTOP UNITS

1.1 Size and Capacity as scheduled on the Drawings.

1.2 RTU shall have a minimum SEER of 16.0

1.3 Acceptable Manufacturer’s
   A. Carrier 48LC
   B. Daikin/McQuay
   C. AAON
   D. Lennox

2.0 HVAC EQUIPMENT INSULATION

2.1 Evaporator fan compartment:
   A. Interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, minimum 1 1/2 lb density aluminum foil-faced insulation on the air side.
   B. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

2.2 Gas heat compartment:
   A. Aluminum foil-faced fiberglass insulation shall be used.
   B. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

3.0 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

3.1 Thermostats
   A. Thermostat must
      1. Have capability to energize 2 or 3 different stages of cooling, and 2 different stages of heating.
      2. Include capability for occupancy scheduling.

3.2 Safeties:
   A. Compressor over-temperature, over-current. High internal pressure differential.
   B. Low-pressure switch.
      1. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
   C. High-pressure switch.
      1. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
D. Automatic reset, motor thermal overload protector.

E. Heating section shall be provided with the following minimum protections:
   1. High-temperature limit switches.
   2. Induced draft motor speed sensor.
   3. Flame rollout switch.
   4. Flame proving controls.

5.0 PANEL AIR FILTERS

5.1 Standard filter section

A. Shall consist of factory-installed, low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.

B. Unit shall use only one filter size. Multiple sizes are not acceptable.

C. Filters shall be accessible through a dedicated, weather tight access panel.

6.0 SELF-CONTAINED AIR CONDITIONERS

6.1 General

A. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing fully hermetic scroll compressors for cooling duty and gas combustion for heating duty.

B. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.

C. Unit shall use environmentally sound, R-410A refrigerant.

D. Unit shall be installed in accordance with the manufacturer’s instructions.

E. Unit must be selected and installed in compliance with local, state, and federal codes.

6.2 Quality Assurance

A. Unit meets and exceeds ASHRAE 90.1 minimum efficiency requirements.

B. Unit meets and exceeds Energy Star and Consortium for Energy Efficiency (CEE) requirements.

C. Unit shall be rated in accordance with AHRI Standard 340/360.

D. Unit shall be designed to conform to ASHRAE 15.

E. Unit shall be ETL-tested and certified in accordance with ANSI Z21.47 Standards and ETL-listed and certified under Canadian standards as a total package for safety requirements.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.

I. Unit shall be designed and manufactured in accordance with ISO 9001.

J. Roof curb shall be designed to conform to NRCA Standards.

K. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.

L. Unit shall be designed in accordance with UL Standard 1995, ETL listed including tested to withstand rain.

M. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.

N. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.


6.3 Delivery, Storage, and Handling

A. Unit shall be stored and handled per manufacturer’s recommendations. B. Lifted by crane requires either shipping top panel or spreader bars. C. Unit shall only be stored or positioned in the upright position.

6.5 Operating Characteristics

A. Unit shall be capable of starting and running at 125°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 340/360 at ± 10% voltage.

B. Compressor with standard controls shall be capable of operation down to 40°F (4°C), ambient outdoor temperatures. For lower operation an integrated economizer shall be utilized to allow lower temperatures and accommodate indoor air quality initiatives.

C. Unit shall discharge supply air vertically or horizontally or any combination thereof as shown on contract drawings.

6.6 Electrical Requirements

A. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

6.7 Unit Cabinet
A. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.

B. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60_F / 16_C): 60, Hardness: H-2H Pencil hardness.

C. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standard 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, aluminum foil faced fiberglass insulation. Aluminum foil-faced fiberglass insulation shall also be used in the gas heat compartment.

D. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections standard. Both gas and electric connections shall be internal to the cabinet to protect from environmental issues.

E. Base Rail
   1. Unit shall have base rails on a minimum of 2 sides.
   2. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   3. Holes shall be provided in the base rail for moving the rooftop by fork truck.
   4. Base rail shall be a minimum of 16 gauge thickness.

F. Condensate pan and connections:
   1. Shall be a sloped condensate drain pan made of a non-corrosive material.
   3. Shall use a 3/4-in -14 NPT drain connection, through the side of the drain pan. Connection shall be made per manufacturer’s recommendations.

G. Top panel:
   1. Shall be a multi-piece top panel linked with water tight flanges and locking systems.

H. Gas Connections:
   1. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
   2. Thru-the-base capability
      a. Standard unit shall have a thru-the-base gas-line location using a raised, embossed portion of the unit basepan.

I. Electrical Connections
   1. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
   2. Thru-the-base capability.
      a. Thru-the-base provisions/connections are available as standard with every unit. When bottom connections are required, field furnished couplings are required.
      b. No basepan penetration, other than those authorized by the manufacturer, is permitted.

J. Component access panels
1. Cabinet panels shall be easily removable for servicing.
2. Unit shall have one factory installed, tool-less, removable, filter access panel.
3. Panels covering control box and filter shall have molded composite handles while the blower access door shall have an integrated flange for easy removal.
4. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.
5. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
6. Collars shall be removable and easily replaceable using manufacturer recommended parts.

6.8 Gas Heat

A. General
1. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
2. Shall incorporate a direct-spark ignition system and redundant main gas valve.
3. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.

B. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.
1. IGC board shall notify users of fault using an LED (light-emitting diode).
2. The LED shall be visible without removing the control box access panel.
3. IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high temperature limit switch.
4. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.

C. Standard Heat Exchanger construction
1. Heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
2. Burners shall be of the in-shot type constructed of aluminum-coated steel.
3. Burners shall incorporate orifices for rated heat output up to 2000 ft (610m) elevation. Additional accessory kits may be required for applications above 2000 ft (610m) elevation, depending on local gas supply conditions.
4. Each heat exchanger tube shall contain multiple dimples for increased heating effectiveness.

D. Induced draft combustion motor and blower
1. Shall be a direct-drive, single inlet, forward-curved centrifugal type.
2. Shall be made from steel with a corrosion-resistant finish.
3. Shall have permanently lubricated sealed bearings.
4. Shall have inherent thermal overload protection.
5. Shall have an automatic reset feature.

6.9 Coils

A. Standard Aluminum Fin/Copper Tube Coils:
1. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved 5/16” diameter copper tubes with all joints brazed.
2. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
3. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.

6.10 Refrigerant Components

A. Refrigerant circuit shall include the following control, safety, and maintenance features:
   1. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range. Shall contain removable power element to allow change out of power element and bulb without removing the valve body.
   2. Refrigerant filter drier - Solid core design.
   3. Service gauge connections on suction and discharge lines.
   4. Pressure gauge access through a specially designed access screen on the side of the unit.
   5. Single circuit design with tandem compressor and fully activated evaporator coil

B. Compressors
   1. Models shall use fully hermetic tandem scroll compressors optimized for comfort taging and IEER energy savings.
   2. Models shall be available with a single refrigerant circuit and two or three stage cooling operation on all models.
   3. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
   4. Compressors shall be internally protected from high discharge temperature conditions.
   5. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
   6. Compressor shall be factory mounted on rubber grommets.
   7. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
   8. Crankcase heaters shall be standard on each compressor and deactivated whenever the compressor is in operation.

6.11 Filter Section

A. Filters access is specified in the unit cabinet section of this specification.

B. Filters shall be held in place by a preformed, slide-out filter tray, facilitating easy removal and installation.

C. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.

D. Filters shall be standard, commercially available sizes.

E. Only one size filter per unit is allowed.

6.12 Evaporator Fan and Motor

A. Evaporator fan motor:
   1. Shall have permanently lubricated bearings.
2. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
3. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
4. Shall be Variable Frequency duty to match the stage compression logic.
5. Shall contain motor shaft grounding ring to prevent electrical bearing fluting damage by safely diverting harmful shaft voltages and bearing currents to ground.

B. Variable Frequency Drive (VFD). For indoor fan motor Staged Air Volume (SAV) operation:
1. Shall be installed inside the unit cabinet, mounted, wired and tested.
2. Shall contain Electromagnetic Interference (EMI) frequency protection.
3. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
4. Self diagnostics with fault and power code LED indicator. Field accessory Display Kit available for further diagnostics and special setup applications.
5. RS485 capability standard.
7. 5% swinging chokes for harmonic reduction and improved power factor.
8. All printed circuit boards shall be conformal coated.
9. Shall not contain visual display to adjust internal setting. Only available as field installed kit.

C. Belt-driven Evaporator Fan:
1. Belt drive shall include an adjustable-pitch motor pulley.
2. Shall use sealed, permanently lubricated ball-bearing type.
3. Blower fan shall be double-inlet type with forward-curved blades.
4. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

6.13 Condenser Fans and Motors
A. Condenser fan motors:
1. Shall be a totally enclosed – multi speed ECM motor.
2. Shall use permanently lubricated bearings.
3. Shall have inherent thermal overload protection with an automatic reset feature.
4. Shall use a shaft-down design.

B. Condenser Fans:
1. Shall be a direct-driven propeller type fan.
2. Shall have galvanized aluminum (galvalum) blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

6.14 Special Features Options and Accessories
A. Ultra low leak Economizer system shall be factory installed
a. Maximum damper leakage rate to be equal to or less than 4.0 cfm/sq. ft. at 1.0 in. w.g., meeting or exceeding ASHRAE 90.1 requirements. Economizer controller shall provide:
b. 2-line LCD interface screen for setup, configuration and troubleshooting.
c. On-board fault detection and diagnostics
d. Sensor failure loss of communication identification
e. Automatic sensor detection
f. Capabilities for use with multiple-speed indoor fan systems
g. Utilize digital sensors: Dry bulb and Enthalpy
1. Shall be capable of introducing up to 100% outdoor air.
2. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
3. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
4. Dry bulb outdoor air temperature sensor shall be provided as standard. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100\(^\circ\)F / 4 to 38\(^\circ\)C. Additional sensor options shall be available as accessories.
5. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
6. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper setpoint.
7. Dampers shall be completely closed when the unit is in the unoccupied mode.
8. Economizer controller shall accept a 2-10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
9. Compressor lockout sensor shall open at 35\(^\circ\)F (2\(^\circ\)C) and close closes at 50\(^\circ\)F (10\(^\circ\)C).
10. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
11. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

B. Adaptive Dehumidification System:

1. The Adaptive Dehumidification System shall be factory installed, certified and tested to provide greater dehumidification of the occupied space by providing two distinct modes of dehumidification operation in addition to its normal design cooling mode:
   a. Subcooling mode further sub cools the hot liquid refrigerant leaving the condenser coil as well as reheat leaving air stream. It can provide both better cooling capacity as well as dehumidification process when both temperature and humidity in the space are not satisfied.
   b. Hot gas reheat mode shall mix a portion of hot gas from the discharge of compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase warm refrigerant in the reheat coil which results in a neutral leaving air temperature when only humidity in the space is not satisfied.

C. Condenser Coil Hail Guard Assembly

1. Shall protect against damage from hail.
2. Shall be louvered style design.

D. Unit-Mounted, Non-Fused Disconnect Switch:

1. Switch shall be factory-installed, internally mounted.
2. National Electric Code (NEC) and ETL approved non-fused switch shall provide unit power shutoff.
3. Shall be accessible from outside the unit.
4. Shall provide local shutdown and lockout capability.
5. Sized only for the unit as ordered from the factory. Does not accommodate field installed devices.

E. Convenience Outlet:

1. Powered convenience outlet.
a. Outlet shall be powered from main line power to the rooftop unit.
b. Outlet shall be powered from line side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be ETL certified and rated for additional outlet amperage.
c. Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
d. Outlet shall include 15 amp GFI receptacles with independent fuse protection.
e. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer.
f. Outlet shall be accessible from outside the unit.

F. Outdoor Air Enthalpy Sensor:
   1. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.

G. Barometric Hood (Horizontal Economizer Applications)
   1. Shall be required when a horizontal economizer and barometric relief are required. Barometric relief damper must be installed in the return air (horizontal) duct work. This hood provides weather protection.

H. Duct mounted ionization smoke detector wired to auxiliary alarm relay contacts to provide fan shut down to prevent the circulation of smoke. Provide connection to building Fire Alarm System.

I. ROOF CURB: A prefabricated heavy gauge galvanized steel, mounting curb shall be provided for field assembly on the roof decking prior to unit shipment. The roof curb shall be a full perimeter type with complete perimeter support of the air handling section and condensing section. The curb shall be a minimum of 14" high and include a nominal 2" x 4" wood nailing strip. Gasket shall be provided for field mounting between the unit base and roof curb.

PART 3.0 INSTALLATION

3.01 GENERAL
   A. Install Unit in accordance with the manufacturer's instructions.

3.02 START-UP
   A. Start-up. Test, and adjust Unit in accordance with manufacturer's start-up instructions. Check and calibrate controls.
SECTION 26 05 00
BASIC ELECTRICAL REQUIREMENTS

1.0 GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor:
   1. Provide all materials, labor, tools, transportation, incidental, and appurtenances to complete all items of work shown on the Drawings and described herein.

1.2 SUBMITTALS

A. Product/Catalog Data
   1. Submit Manufacturer's catalog data for each manufactured item.
      a. Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
      b. Include name, address, and phone number of each supplier.

B. Operations and Maintenance Manuals
   1. Provide three (3) sets of manufacturers printed information in three (3) ring binders containing information on installation, operation, and maintenance for each piece of equipment supplied.
      a. The information shall list any maintenance requirements and time duration between required maintenance.
      b. The information shall show all parts and part numbers of available replacement parts for each piece of equipment.
      c. A cross-index of material and equipment shall be furnished containing:
         1.) An alphabetical listing of material and equipment including manufacturer's name, address and contact person of the local sales representative.
         2). An alphabetical listing of all subcontractors including name, address, contact person, and specific work performed.

1.3 QUALITY ASSURANCE

A. Complete installation shall conform with all applicable Federal and State Codes including, but not limited to the latest approved editions of the following:
   1. State Building Codes.
   2. Code of Federal Regulations (CFR)
   3. National Electrical Code (NFPA-70)
   5. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto.
   6. Illinois Department of Public Health (IDPH)

B. Nothing contained in the drawings and specifications shall be construed to conflict with these laws and codes and they are hereby included in these specifications.
1.4 COORDINATION

A. Coordinate clearances about all electrical equipment with existing conditions, building structure and other trades to ensure all manufacturers required clearances are met. Reroute and/or relocate all conduit, etc. as necessary to accommodate equipment clearances. It shall be the Contractor’s responsibility to ensure that all manufacturers’ required clearances are met.

1.5 OWNER’S INSTRUCTIONS/TRAINING

A. Contractor shall train Owner’s representatives in operation and maintenance of all electrical equipment and systems.

B. Provide this training to a minimum of three (3) persons.

C. Provide training above in 2-different 4-hour sessions, each on a different day as part of the contract.

D. Training sessions shall be individualized in nature and specific for this project. Generalized “group” sessions involving multiple building operators from non related facilities will be specifically prohibited.

2.0 PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. All equipment and materials furnished and installed by Contractor shall be new. The equipment to be furnished and installed shall be standard cataloged products of manufacturers regularly engaged in the production of electrical equipment and shall be of the latest design. Equipment of the same general type shall be of the same make throughout the project.

B. The Contractor shall be responsible for the physical fit and configuration of the equipment to suit the space available and the intent of the Work. Due consideration shall be included for external connections and service maintenance access of the Project Documents.

C. The Contractor shall verify in the course of preparing the submittals that the respective material and equipment comply with the criteria set forth in the Project Documents.

3.0 EXECUTION

3.1 GENERAL

A. Contractor must read the entire Specifications covering other branches of Work. Contractor is responsible for coordination of his work with work performed by other trades.

B. Consult all Contract Documents which may affect the location of any equipment or apparatus furnished under this Work and make minor adjustments in location as necessary to secure coordination.

C. System layout is schematic and exact locations shall be determined by structural and other conditions. This shall not be construed to mean that the design of the system may be
arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with equipment included under other Divisions of Work.

D. Contractor shall contact the A/E immediately if he notices any discrepancies or omissions in the Contract Documents, or if there are any questions regarding the meaning or intent thereof.

E. Submit all changes, other than minor adjustments to the A/E for approval before proceeding with the work.

F. All workmanship to be of the highest quality in accordance with the best practices of the trade by craftsmen skilled in this particular work.

3.2 DRAWINGS

A. Drawings are schematic and show approximate locations of electrical equipment. Exact location should be coordinated by the Contractor and verified in field prior to rough-in.

B. Significant deviations from drawings must be approved by the A/E.

C. A/E reserves the right to make minor changes in the location of outlets and equipment, up to the time of rough-in, without additional cost.

3.3 PROTECTION AND CLEANING

A. Protect all fixtures against damage from leaks or abuse and pay the cost of repair or replacement of fixtures or equipment made necessary by failure to provide suitable safeguards or protection.

B. After all fixtures have been set, thoroughly clean all fixtures with manufacturers recommended cleaning agents, removing stickers and other foreign matter and leave every part in acceptable condition, clean and ready for use. Install all new lamps and check for satisfactory operation.

C. Repair all dents and scratches in factory prime or finish coats on all electrical equipment. If damage is excessive, replacement may be required.

3.4 CUTTING AND PATCHING

A. The Contractor shall be responsible for all required digging, cutting, etc., incident to his work and shall make all required repairs thereafter to the satisfaction of the A/E, but in no case shall the Contractor cut into any major structural element, beam or column without the written approval the A/E. The Contractor or trade requiring the opening shall be responsible for verifying the existence of any concealed utilities or services within the surface and shall pay all costs of repairing or replacing any such surfaces or utilities which are damaged.

3.5 PENETRATIONS

A. Sleeves shall be installed in all walls and floors where conduits or raceways are to pass through. Use heavy wall steel pipe sleeves, anchored to building construction and finished plumb with wall, ceiling, or floor lines. Sealing assembly shall be UL listed.

B. Seal all penetrations thru fire-rated construction (i.e. walls, floors, ceilings, etc.) in accordance with NEC. Fill void space around raceway.
3.6 TESTING AND ADJUSTING

A. The Contractor shall, at the conclusion of the project, performance test and adjust all of the electrical systems to verify the performance of all systems and subsystems installed and in all areas of the building.

B. All power systems, communication systems, control systems and other related devices and subsystems shall be operated by the Contractor for a period of no less than seventy-two (72) hours and shall be systematically tested for proper sequencing, control, connection, phasing, rotation and calibration.
1.0 GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor:
   1. Provide all necessary wire and cable of the sizes and types shown on the plans or specified herein for:
      a. General power distribution and branch circuit system
      b. Lighting systems
      c. Control systems
      d. Fire alarm systems.

1.2 QUALITY ASSURANCE

A. Installation shall comply with NFPA 70 - National Electric Code (NEC).
B. Insulation types, ratings and usage shall be in accordance with National Electrical Code requirements.
C. Wire and cable shall be constructed in accordance with ICEA, NFPA, NEMA and IEEE published standards and shall be UL listed.

1.3 SUBMITTALS

A. No submittals required when using specified materials.

2.0 PRODUCTS

2.1 LOW VOLTAGE WIRE AND CABLE (600V OR LESS)

A. General
   1. All conductors shall be 98% conductivity copper.
   2. Unless otherwise noted, minimum wire size for lighting and power branch circuits shall be No. 12 AWG. For control and auxiliary systems, the minimum size shall be No. 14 AWG.
   3. Conductors for emergency power and exit wiring shall be minimum #12 AWG.
   4. Insulation on power and control systems wiring 480 volts and below shall be 600 volt rated, type XHHW, THWN or THHN. Insulation of conductors for other systems shall be 600 volt unless otherwise noted.
   5. Type XHHW or THWN insulation must be used for all conductors installed in wet locations. This includes all outdoor feeders and branch circuits, underground conduit runs and conduits run in slab on grade.
   6. Conductors size 8 AWG and larger shall be Class B stranded. Conductors size 10 AWG and smaller may be solid or stranded. Conductors size 14 AWG for control and auxiliary systems shall be stranded.
B. Acceptable Manufacturers: Cable and wire shall be a standard type as manufactured by:

1. General Cable Company
2. Carol
3. Anaconda
4. Roma
5. ITT Royal
6. Beldon Wire and Cable

2.3 CONNECTIONS AND SPLICES

A. 600V and Less

1. All components used at wiring terminations, connections and splices shall be UL listed.

2. Connectors for joints #10 AWG and smaller sizes to be made with spring connectors insulated with vinyl skirt and live spring. Prior to installation, wires shall be properly twisted together.

3. Connectors for #8 AWG (copper) and up to #2/0 sizes to be high-pressure type mechanical crimp connectors applied to a cleaned wire surface. Insulate splices with electrical insulating putty and tape to cover with four layers, half lapped.

4. Connections for #3/0 (copper) and larger shall be Cadwelded. Insulate splices using electrical insulating putty and tape to cover with four layers, half lapped.

B. Acceptable Manufacturers

1. Thomas and Betts
2. 3M
3. Buchanan
4. Ideal

3.0 EXECUTION

3.1 INSTALLATION

A. General

1. A separate neutral, sized in accordance with the National Electrical Code shall be installed for each feeder or branch circuit.

2. Install vinyl markers to identify branch circuits where they enter panel boards, pull boxes, junction boxes and device boxes.

3. Color coding shall occur at all conductor termination points and in all junction boxes and pullboxes. Identification may be by colored insulation or colored electrical tape at the Contractor's option (See Section 16075 - Electrical Identification).

B. Power and Branch Circuits

1. Conductor sizes as shown on the Drawings and specified herein are minimum and shall be increased as required to maintain a minimum voltage drop of 3% for any branch circuit and 5% at any point in the system. Conductor size shall be increased
as required by NEC where more conductors are installed in a common raceway than indicated on the Drawings.

2. Conductors shall be color coded for their entire length in accordance with NEC; all wiring shall be color coded using the same color for each conductor within a system.

3. Wire size shall be #12 AWG minimum for branch circuit wiring.

4. Minimum size conductors for 120/208V or 277/480V shall be #12 AWG. Increase conductors at least one (1) size for home run feeders over 75 feet long or if furthest outlet is greater than 125 feet from feeder panel.

C. Control Systems

1. Control and systems wiring shall be terminated using forked tongue terminals.

2. Terminal strip connectors shall be ratchet-tooled in accordance with manufacturer’s recommendations. Plier type crimp is not acceptable.

D. Provide self adhesive tape minimum 3-inch wide band on larger size conductors for color codes. Tape color shall be per conductor color codes. Tape shall be provided at all terminations in switchgear, panelboards, pull boxes, motor controllers, disconnect and starters.

F. All fasteners and lugs used for electrical connections shall be torqued to values indicated by manufacturer’s instructions. Use particular care to equalize lug torques where parallel conductor feeders are used. Use approved lugs when copper conductor is to be connected to aluminum bus.

3.2 TESTING

A. Upon completion of cable and wire installation, but before termination to equipment, test each wire for grounds and short circuits. Replace or correct defective wiring.
SECTION 26 05 26
GROUNDING

1.0 GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor provide:

1. Grounding systems complete as shown in the Contract Documents and as specified herein, including but not limited to the following:

   a. Main Service
   b. Equipment Grounding
   c. Transformer Grounding
   d. Driven rod electrode field
   e. Wiring Devices

1.3 QUALITY ASSURANCE

A. Equipment and system grounding shall be in accordance with NFPA 70 - National Electrical Code (NEC), 2002 edition.

B. Grounding and bonding shall be performed in accordance with National Electrical Installation Standards NECA 331-2004, Standard for Installing Building and Service Entrance Grounding.

2.0 PRODUCTS

2.1 MATERIALS

A. Pipe Clamps

1. Pipe clamps shall be heavy duty, high copper alloy or cast bronze with silicon-bronze threaded fasteners; saddle type designed for the size of conductor indicated on the Drawings.

B. Beam Flanges

1. Beam flanges shall be compression type, heavy duty, bronze construction and provide a minimum 8 square inches bonding surface.

C. Ground Rods

1. Copper - encased steel, 5/8” outside diameter, minimum length of 10 feet.

D. Connections:

1. All rod to cable, and cable to cable connections shall be by an approved exothermic or mechanical weld process.
2. Connections to metallic pipe may be by either exothermic weld or approved ground clamp.
3. Any splices to ground electrode conductors shall be exothermic weld only.
E. Terminating Lugs
   1. Exothermic weld or crimp compression type

F. Wire
   1. Equipment grounding conductors shall be insulated. Insulation shall be 600 volt, same type as phase conductors and green in color.
   2. Ground electrode conductors shall be bare annealed copper.

2.2 APPROVED MANUFACTURERS

1. T&B
3. Burndy

3.0 EXECUTION

3.1 INSTALLATION

A. The building shall have one (1) building-wide grounding system. Electrical contractor shall be responsible for making the appropriate connections between the structural steel, water system, grounding rod(s), etc.

B. Ground all equipment, including but not limited to panelboards, switchboards, transformers, conduit systems, receptacles, light fixtures, appliances, and other apparatus, to the grounding system. Ground receptacles and other equipment with a separate grounding wire. Pull separate ground to all receptacles and other equipment, DO NOT use conduit as a means for grounding of receptacles or any other devices.

C. Electrical systems grounding conductors shall be installed in metallic raceway unless otherwise shown on the Drawings.

D. Transformers shall be grounded to conform with the NEC.

E. Grounding conductor shall be sized in accordance with NEC. Maximum resistance to ground shall not exceed 25 Ohms.

F. For electronic equipment, a unipoint grounding technique shall be employed. Shields and ground shall be brought to a single ground plane connected by an equipment grounding conductor to a panelboard ground bar, except as may otherwise be indicated on the Drawings.

G. All conduits for 120 VAC and above voltages shall contain minimum #12 THWN green insulated ground conductor.

H. All conduits and buses entering switchboard/panelboard shall be grounded to switchboard/panelboard ground bus.

I. Bond all raceways, cabinet enclosures, and noncurrent-carrying parts of equipment to grounding system. Bond raceways such that a continuous path for current flow is maintained.
J. All greenfield shall have green ground conductor.

3.2 SERVICE ENTRANCE GROUNDING

A. Electrical Contractor shall provide grounding for secondary of main service transformer. Transformer grounding shall be in accordance with the NEC.

B. Ground electrical service neutral at service entrance to metal underground water pipe, structural steel, rebar in footings and supplementary made electrodes (ground rods).

C. Connect main grounding electrode conductor(s) to water piping, structural steel and rebar with an approved ground clamp or exothermic weld.

D. Make connections to flanged piping at street side of flange. Provide bonding jumper around insulated joints, filtering devices, water meter and similar equipment where necessary to maintain the electrical continuity of the bonding connection to interior piping.

E. The grounding bus shall be bonded to the grounded neutral bar inside the service disconnect enclosure (i.e. main panel/disconnect at service entrance) using a Main Bonding Jumper.

3.3 FIELD QUALITY CONTROL

A. Ground resistance shall be measured using suitable ground resistance measuring equipment.

B. Resistance measurement shall be from the system neutral connection at the service entrance to a convenient ground reference point. The ground reference point should be located to minimize the effects of other existing grounding electrodes.

C. Ground resistance shall not exceed 16 OHMS. When resistance exceeds 10 OHMS, one of the following measures shall be taken to reduce the ground resistance:

   1. Drive and bond additional ground rods at two rod length intervals.
   2. Treat the soil in the vicinity of the electrode with metallic salts.
   3. Remove soil from around the electrode and replace with bentonite.
   4. Use a Nationally Recognized Testing Laboratory approved electrolytic chemical ground rod

D. All resistance tests shall be taken no sooner than 48 hours after a measurable rainfall.
1.0 GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor:

1. Furnish and install complete conduit and raceway systems as required for power, lighting, control, communications, fire and safety systems as shown in the Drawings and specified herein.

2. Furnish and install all outlet, junction and pull boxes as indicated on the Drawings and as necessary to install the required conduit and wiring in a neat and workmanlike manner, as specified herein.

1.2 QUALITY ASSURANCE

A. Pull boxes and junction boxes shall be in accordance with NEC requirements and shall be listed by a Nationally Recognized Testing Laboratory.

B. Raceways shall meet NEMA standards and shall be listed and labeled by a Nationally Recognized Testing Laboratory.

2.0 PRODUCTS

2.1 CONDUIT

A. Thin wall conduit (EMT) shall be installed for all work except where noted otherwise.

1. EMT, couplings, and fittings shall have a circular cross section of sufficient diameter to meet all State Codes. The wall thickness shall be uniform throughout with the interior surface free of defects. Welding of seams shall be continuous.

B. Rigid galvanized steel conduits shall be used outdoors and in all mechanical rooms where not supported directly to walls or ceilings.

1. Rigid conduit shall be heavy wall, threaded, hot dipped galvanized steel. Each section of conduit furnished shall be free from blisters and other surface defects. Galvanizing shall not crack or flake when conduit is bent.

C. PVC conduits shall be installed underground or in concrete slabs. Rigid galvanized elbows shall be used for all stub-ups through or out of concrete slabs.

1. PVC conduit shall be extra heavy wall, Schedule 80. Conduit shall be suitable for use with 90 degree C insulated wire. Conduit, fittings, and cement shall be of the same manufacturer.

D. Jacketed flexible steel conduit (Sealtite) shall be used in wet areas where flexible conduit connections are required and on all motorized equipment and motors.
1. Flexible steel conduit shall be made from a continuous length of galvanized cold rolled steel strip, spirally wound. Adjacent strips shall have locked typed construction with all the edges turned in.

E. Liquid-tight flexible steel conduit shall consist of a steel core of the same construction as specified for flexible steel conduits, with an extruded PVC jacket.

F. Minimum conduit size shall be ¾-inch for all home runs. Runouts serving a single electrical device may be ½-inch.

G. All conduit shall be listed by a Nationally Recognized Testing Laboratory.

H. Acceptable Manufacturer’s

1. Pittsburgh Steel
2. Allied
3. Republic Steel
4. National Electric
5. Keystone
6. Jones and Laughlin
7. Carlon

2.2 FITTINGS

A. All fittings shall be UL Listed, insulated-throat type.

B. Couplings and connectors for thin wall conduit shall be all steel type. No die cast connectors will be allowed.

C. Expansion and deflection fittings shall be of a type suitable for the particular condition and shall be complete with bonding jumper.

D. Acceptable Manufacturer’s

1. Thomas and Betts (T&B)
2. O-Z Gedney
3. Appleton
4. Raco

2.3 BOXES

A. Flush outlet and switch boxes shall be made of code gauge galvanized steel, minimum 3-1/2" depth, unless otherwise specified or shown on the Drawings. Box sizes shall be selected as required to comply with the NEC.

B. Junction and pull boxes shall be made of code gauge galvanized steel, minimum 4" square and 1-1/2" deep, with removable cover plates fastened with screws or hinged doors as indicated or required. Box sizes shall be increased as required to comply with the NEC.

C. Boxes for exposed work in finished areas shall be Type FS/FD with threaded hubs and rigid conduit risers.

D. Steel boxes cast in concrete or installed in masonry construction shall be specifically designed for concrete installation.
E. Boxes used outdoors shall be weatherproof, while-in-use type.

F. Acceptable Manufacturer's
1. Appleton
2. Raco
3. Killark
4. Hoffman
5. Thomas and Betts/Steel City
6. Square D
7. O.Z./Gedney

3.0 EXECUTION

3.1 CONDUIT

A. In finished areas, conduit must be concealed above accessible ceilings, within the building structure, or within chases. Exposed conduits to be run tight to wall or ceiling and installed in a neat workmanlike manner, ready for painting.

B. All conduit shall be supported by suitable clamps or hangers attached to the elements of the building structure at the required spacing to provide rigid installation. In no case shall conduit be attached to or supported from adjoining ductwork or pipe, ceiling systems, or installed in such manner as to prevent the ready removal of other pipe for repairs.

C. Install conduit parallel or perpendicular to building lines (except where run in or below floor slabs). Keep conduit runs as close to underside of structure as possible.

D. No more than the equivalent of four (4) 90-degree bends will be allowed in any one conduit run. Where more bends are necessary in any single run, a pull box shall be installed. Pull boxes shall also be installed in long runs at a maximum separation of 100'-0".

E. Exercise necessary precautions to prevent accumulation of water, dirt, or concrete in conduits during execution of electrical work. Conduit in which water or foreign material has been permitted to accumulate shall be thoroughly cleaned or replaced where such accumulations cannot be removed.

F. Do not run conduit in slabs under boilers, hot water heaters or other heat-producing equipment and maintain minimum 6" clearance from hot water piping.

G. Install a 240 lb. tensile strength poly pull line or a #12 THHN or THWN pull wire in all empty conduits.

H. Install expansion fittings at all locations where conduits cross building expansion joints.

I. Secure rigid conduit at cabinets and boxes using insulated throat type grounding and bonding bushings. Locknuts shall be tightened to cut through painted surfaces.

J. Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers or unistrut racks tight to the building structure. Hanger rods shall be fastened to concrete ceiling slab with threaded rod in steel expansion bolt type inserts. Trapeze hangers shall be Unistrut, angle iron or channel iron. Each conduit shall be clamped to the trapeze hanger with conduit clamps.
K. Metallic conduit systems shall be grounded in accordance with the NEC, and as shown on the Drawings. Metallic conduit systems shall be metallically joined together into a continuous electrical conductor and shall be so connected to all boxes, fittings, and cabinets to provide effective electrical continuity.

L. Threaded couplings shall be used for joints on rigid metallic conduit. Field joints shall be cut square, reamed smooth to remove burrs and sharp and rough edges, and properly threaded to receive couplings. The use of running threads is not permitted.

M. Conduit systems shall be supported at each elbow and the end of every straight run terminating in a box or cabinet. Fastening shall be provided at maximum spacing of 7 ft. for horizontal runs and 8 ft. for vertical runs, unless codes require more stringent supporting. Conduit shall not be fastened to other pipe or installed to prevent ready removal of other pipe for repairs. The use of perforated strap hangers is not permitted.

N. Conduit to be buried shall be installed a minimum of 24 in. below finished grade.

O. Where telephone/data outlet locations are indicated on the Drawings, install 1” EMT from telephone outlet box and 1” conduit from data outlet box (4” x 4” x 1-1/2” or 4” x 2” x 1-1/2”) to top of finished wall or a point above accessible ceiling.

3.2 BOXES

A. Support all boxes independently of conduit except for cast boxes connected to two (2) rigid conduits both supported within 12-inches of box.

B. Provide knockout closures of the correct size to cap unused knockout holes where blanks have been removed.

C. Outlet Boxes

1. Flush mount outlet boxes in areas other than mechanical rooms, electrical rooms and above removable ceilings.
2. Provide at least 6-inch separation between outlet boxes. Do not install boxes back to back in same wall unless specifically noted on the plans. If specifically noted on the plans, install 2 pieces of 5/8” drywall between the boxes to maintain both fire rating and soundproofing of wall.
3. Use multiple gang boxes where possible when more than one device is mounted together. Provide barriers to separate different voltage systems.
4. Provide weatherproof cast boxes for exterior and wet locations.

D. Junction and Pull Boxes

a. Mount junction and pull boxes securely to building structure in a location that meets the requirements of the National Electrical Code for accessibility and workspace clearance. Coordinate exact locations of work with other trades.
b. Support independent of conduit
c. Locate pull or junction boxes to limit conduit runs to no more than 100 linear feet or four (4) 90-degree bends between pulling points.

E. Provide covers for all boxes.
3.3 MOTOR CONNECTIONS

A. The final 18 in. of connections to motors shall be made in liquid-tight flexible steel conduit.
1.0 GENERAL

1.1 WORK INCLUDES
A. Electrical Contractor: Provide identification for all new electrical equipment as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
   1. Panelboards
   2. Conductors and Conduit
   3. All other pertinent electrical devices

1.2 QUALITY ASSURANCE
A. Comply with:
   2. NFPA 70 - National Electric Code (NEC)

1.3 REFERENCES.
B. Underwriters Laboratories, Inc. (UL): All products UL listed and labeled.
C. Manufacturers' Catalogs: Specification manufacturers' catalogs are incorporated by reference to same force and effect as if repeated herein in full.

1.4 SUBMITTALS
A. Provide schedule of proposed identification plate wording for A/E approval.

2.0 PRODUCTS

2.1 EQUIPMENT IDENTIFICATION PLATES
A. Provide plates for switchgear, disconnects, panelboards and all other pertinent electrical equipment consisting of machine engraved laminated plastic. Plate field shall be black core.
   1. Size of plate shall be commensurate with lettering thereon.
   2. Lettering for major items of equipment, such as a switchboard, shall be 3/4" in height. Lettering for smaller items, such as switches, shall be 1/2" in height.
   3. Wording on plate shall contain the following information as appropriate and approved by the Engineer.
      a. Drawing nomenclature.
      b. Equipment served.
      c. Voltage.

B. Acceptable Manufacturers:
   1. Quentin D. Schwab, 606 E. Dodson Dr., Urbana, IL 61801.
   2. Joe Halm Building Specialties, Box 525, LaGrange, IL.
   3. Mechanical Tag Systems, Box 1565, Cedar Rapids, IA 52406.
   4. Seton Name Plate Corp., 592 Boulevard, New Haven, CT 06505.
   5. N & E Specialty Co., Box 3518, Peoria, IL 61614.
6. Artistic Engravers, Box 1385, Peoria, IL 61654.

2.2 WIRING SYSTEM IDENTIFICATION

A. Wire insulation color:

1. 277Y/480V, 3 phase
   - Phase A: Brown
   - Phase B: Orange
   - Phase C: Yellow
   - Neutral: White
   - Ground: Green
   - Isolated Ground: Green with yellow stripe

2. 120Y/208V, 3 phase
   - Phase A: Black
   - Phase B: Red
   - Phase C: Blue
   - Neutral: White
   - Ground: Green
   - Isolated Ground: Green with yellow stripe

B. Code all wire and cable larger than color coded sizes available from manufacturer by application of electrical plastic tape in colors specified. Apply tape in uniform manner circling wire or cable. Half-lap tape for length of cable as required by NEC. Tape shall be 3M, Plymouth or Permacel.

C. Maintain consistent coding throughout installation to ensure proper phase identification.

D. Control wiring may use numbered or lettered marker tape. Record wiring so marked on project record documents. Marker tape shall be 3M Scotch Code, Panduit Insta-Code, T & B E-Z Coder, Stranco Tuff-Code, Bradypack or Electrovert.

3.0 EXECUTION

3.1 INSTALLATION

A. Affix Equipment Identification Plates to equipment with stainless steel self tapping screws.

B. Apply markers or bands on all exposed conduit at 50 ft. intervals, at all junction boxes and on both sides of walls through which conduits penetrate.
SECTION 26 24 16
SERVICE AND DISTRIBUTION

1.0 GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor

1. Provide complete electrical system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
   a. Main Distribution panel(s)
   b. Branch circuit panel(s) for power and lighting
   c. Circuit Breakers
   d. Safety/Disconnect Switches
   e. Fuses

1.2 QUALITY ASSURANCE

A. Switchboards, panelboards, overcurrent devices and cabinets shall be Nationally Recognized Testing Laboratory.

B. Materials, equipment, and workmanship shall conform to the applicable standards of the following organizations:

3. Underwriters Laboratory (UL).
4. Insulated Cable Engineer Association (ICEA).

1.3 SUBMITTALS

A. Product data:

1. Manufacturer’s specifications and other data needed to prove compliance with the specified requirements;
2. Manufacturer’s recommended installation procedures.

B. Manual: Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the A/E two (2) copies of all operation and maintenance. Include within each manual:

1. Copy of approved Record Documents for this portion of the work including installation instructions.
2. Copies of all circuit directories;
3. Copies of all warranties and guarantees.
2.0 PRODUCTS

2.1 GENERAL

A. Enclosures shall meet the following construction standards unless noted otherwise:
   1. Indoors: NEMA 1, general use or NEMA 12, dusttight
   2. Outdoors: NEMA 3R, raintight

2.2 MAIN SWITCHBOARD

A. The switchboard shall be dead front with front access only in a NEMA 1 enclosure.
B. The switchboard bussing shall be plated copper in accordance with UL 891.
C. Switches shall be provided in the sizes and arrangements shown on the Drawings.
D. Acceptable Manufacturer’s
   1. Square D
   2. Siemens
   3. Cutler-Hammer
   4. General Electric

2.3 PANELBOARDS

A. Panelboards shall consist of devices assembled into single interior unit mounted in sheet steel enclosure consisting of box and front. Minimum capacity shall be as noted on the Drawings.
B. Boxes shall be fabricated from code-gauge, galvanized sheet steel, with turned edge provided around front of box for rigidity and attachment of front and finished in gray enamel over rust inhibitor.
C. Wiring gutters shall be in accordance with the NEC.
D. Fronts shall be flat piece of sheet steel with opening, attached to box with adjustable trim clamps.
E. Interiors shall be unit type, mounted on a back plate, properly reinforced by flanging providing a rigid assembly to protect against damage during handling or installation.
F. Units shall be easily removable without disturbing adjacent units, structure, or insulation, and shall be provided with removable dead front shield for easy access to wiring.
G. Adjacent poles shall be of unlike polarity and alternated in sequence.
H. Panelboards shall be supplied with a grounding bus.
I. Panelboards shall be listed by a Nationally Recognized Testing Laboratory and constructed and tested in accordance with NEMA standards
J. Panelboards shall have copper bussing.
K. Unless noted otherwise, all panelboards shall be supplied with keyed locks.
L. Acceptable Manufacturer’s
   1. Square D - NQOD Series
   2. Siemens
   3. Cutler-Hammer
   4. General Electric

2.4 CIRCUIT BREAKERS
A. Circuit breakers shall have the following: quick-make, quick-break operating mechanisms; over-center, trip-free, toggle-type switch; silver-alloy contacts; arc quencher; and thermal-magnetic, non-adjustable, fixed trip, unless otherwise specified.
B. Tripping shall be indicated by the position of the handle between the on and off positions. There shall be a common trip on multi-pole breakers.
C. Circuit breakers shall be listed by a Nationally Recognized Testing Laboratory and tested in accordance with NEMA standards.
D. Connections shall be bolted.
E. Acceptable Manufacturer’s
   1. Square D - QOB Series
   2. Siemens
   3. Cutler-Hammer
   4. General Electric

2.5 SAFETY/DISCONNECT SWITCHES
A. All safety or disconnect switches shall be classified as Heavy Duty and enclosed as required by NEMA Standards. Switch size and fusing shall be as shown on the Drawings.
B. Switches shall have a quick-make, quick-break mechanism operating through the box and not the cover. The switch blades shall be visible when the hinged door is open.
C. Switches shall have high pressure fuseholders, interlocking cover with handle to prevent opening of cover with the switch in the on position and provisions to padlock the switch in the off position.
D. Safety switches shall be listed by a Nationally Recognized Testing Laboratory and constructed and tested in accordance with NEMA standards.
E. Acceptable Manufacturer’s
   1. Square - D H Series
   2. Siemens - VBII Series
   3. Cutler-Hammer - DH Series
   4. General Electric

2.7 FUSES
A. Cartridge fuses rated 600 Amps and less shall have standard NEC dimensions. Those rated at more than 600 Amps shall be for stud mounting and shall have dimensions to fit the equipment specified.
B. Maximum allowable delays shall be in accordance with NEMA standards where applicable. Dual element, time delay fuses shall be capable of carrying 500% of rated current for at least 10 seconds. As specified and/or where necessary, provide current-limiting fuses. Where current limiting fuses are used, identification must be present and permanent to aid in future replacement.

C. Approved Manufacturer’s
   1. Bussmann
   1. Gould-Shawmut
   3. Littlefuse

2.9 GROUNDING

A. The building shall have one (1) building-wide grounding system. Electrical contractor shall be responsible for making the appropriate connections between the structural steel, water system, grounding rod(s), etc...

B. Ground all equipment, including panelboards, switchboards, transformers, conduit systems, receptacles, light fixtures, appliances, and other apparatus to an independent grounding system. Ground receptacles and other equipment with a separate grounding wire. Pull separate ground to all receptacles and other equipment, DO NOT use conduit as a means for grounding of receptacles or any other devices.

3.0 EXECUTION

3.1 GENERAL

A. Workmanship and method of construction shall conform to the applicable standards of the National Electric Code (NEC).

B. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Coordinate:
   1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the Work of this Section.
   2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total Work.
   3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.

B. Contractor shall verify all measurements at the site.

C. The Electrical Drawings are diagrammatic, but are required to be followed, as closely as actual construction and work of other trades will permit. Where deviations are required to conform to actual construction and the Work of other trades, make such deviations
without additional cost to the Owner. All deviations shall be noted in the As-Built Drawings, with all major deviations verified by the Architect/Engineer.

3.4 INSTALLATION OF SWITCHBOARDS AND POWER PANELS

A. Mounting

1. Unless otherwise shown on the Contract Documents, install panelboards with the top of the trim 6'-3" above the finished floor.

2. Switchboards shall be convenient for use, readily accessible for maintenance, clear of traffic lanes, and in a dry ventilated space free of corrosive fumes or gases.

3. Panelboards serving lighting and appliance circuits shall be located on the same floor as the circuits they serve. This does not apply to emergency system circuits.

4. Provide circuit breakers in new panelboards as indicated by the Contract Documents.

B. Labeling

1. Mount a typewritten directory behind glass or plastic on the inside of each panel door and, on the directory, show the circuit number and complete description of all loads served.

2. Provide engraved nameplate on front of panelboard with panelboard designation, and feeder source.

3.5 CLEAN AND ADJUST

A. Upon completion of the Work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil and other foreign material and using only the type of cleaner recommended by the manufacturer of the item being cleaned.

B. Thoroughly indoctrinate the Owner’s operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted.
SECTION 26 27 26
WIRING DEVICES

1.0 GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor
   1. Furnish and install wiring devices, complete with cover plates, as shown on the Drawings and specified herein.
   2. Provide receptacle ampacity and electrode configuration to accommodate equipment to be served.

1.2 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

B. Wiring Devices shall be listed and labeled by a Nationally Recognized Testing Laboratory.

C. Wiring Devices shall be in accordance with NEC, NFPA, and NEMA standards.

1.3 SUBMITTALS

A. Submit product literature for the following:
   1. Receptacles
   2. Switches

B. Provide color selection information for receptacles, switches and cover plates. A/E will select color.

2.0 PRODUCTS

2.1 GENERAL

A. Grounding type devices shall meet all requirements set forth by the NEC and/or State Codes.

B. Unless noted otherwise, all wiring devices shall be specification grade.

C. Colors for receptacles, switches and cover plates shall be selected by the A/E.

2.2 RECEPTACLES

A. General
   1. Unless otherwise noted, receptacles shall be white in color, duplex, polarized, 3-wire, grounding type with bronze contacts, rated for 20 Amp at 120 VAC, with parallel slots and two ground terminals. Receptacles shall have screw terminals arranged for back or side wiring.
2. Weatherproof receptacles shall weatherproof while in use type.

3. Special purpose receptacles shall be of the capacity and design indicated on the Drawings.

B. General Purpose Receptacles

1. General-purpose receptacles for all wall type convenience outlets in non-hazardous locations shall be 20 Amp, 120V, 3-wire, grounding type, NEMA 5-20R, back and side wire compatible, heavy-duty industrial specification grade.

2. Acceptable Manufacturers
   a. Leviton 5362-A
   b. Hubbell HBL5362
   c. Pass & Seymour 5362-A

C. GFCI Receptacles

1. Duplex receptacles with ground fault circuit interrupters (GFCI) shall comply with UL Class A GFCI testing in accordance with UL Standard No. 943. Receptacles shall be 20 Amp with NEMA 5-20R receptacle configuration. Receptacle shall be back and side wire compatible, feed-thru type.

2. Acceptable Manufacturers
   a. Leviton 6899
   b. Hubbell GF5362
   c. Pass & Seymour 2091-S

2.3 SWITCHES

A. General Purpose Toggle Switches: Switches for use in non-hazardous locations shall be white in color (unless otherwise noted), furnished with screw terminals for looped or back wiring and be of the quiet, toggle type. Switches shall be industrial specification grade, rated for 20 Amp at 120/277 VAC.

1. Single Pole
   a. Leviton 1221-2
   b. Hubbell HBL1221
   c. Pass & Seymour 20AC1

2. Two Pole
   a. Leviton 1222-2
   b. Hubbell HBL1222
   c. Pass & Seymour 20AC2

3. 3-way
   a. Leviton 1223-2
   b. Hubbell HBL1223
   c. Pass & Seymour 20AC3

4. 4-way
   a. Leviton 1224-2
   b. Hubbell HBL1224
   c. Pass & Seymour 20AC4

2.4 COVER PLATES
A. Indoors: Cover plates shall be high-strength, scratch-resistant, smooth nylon, white in color (unless otherwise noted).

B. Outdoors:
   1. Dry Locations: Cover plates shall be stainless steel or die cast aluminum. Plates of non-ferrous metal shall be not less than 0.04 in. thick; those of ferrous metal shall be not less than 0.03 in. thick.
   2. Wet Locations: Cover plates shall be die cast aluminum or impact resistant thermoplastic construction and rated weatherproof while-in-use.

C. Acceptable Manufacturer’s
   1. Leviton
   2. Hubbell
   3. Pass & Seymour

3.0 EXECUTION

3.1 GENERAL INSTALLATION

A. Boxes and devices shall be mounted vertically and securely fastened.
B. Mount switches in multi-gang boxes wherever several devices are grouped together.
C. Where more than one switch is shown at a location, switches shall be installed under a gang plate.
D. Unless otherwise noted on the drawings, all toggle switches shall be installed 46-inches above finished floor level and all general-purpose receptacles shall be 18-inches above finished floor level. All dimensions refer to the centerline of the box.
E. Boxes and devices located in a brick veneer wall shall be mounted horizontally in the brick course.
1. **GENERAL**

1.1 **WORK INCLUDES**

A. Electrical Contractor

   1. Furnish and install lighting fixtures complete with lamps in accordance with the lighting fixture schedule shown on the Drawings and described herein.

   2. Units shall be complete with suspension accessories, canopies, sockets, louvers, frames, and rough-in boxes, wired and assembled for a complete working system.

1.2 **REGULATORY REQUIREMENTS**

A. All fixtures and accessories shall be listed by a Nationally Recognized Testing Laboratory (NTSL).

B. All fixtures shall be in accordance with NEC.

1.3 **SUBMITTALS**

A. Provide manufacturer's product information for all Luminaries.

1.4 **WARRANTY**

A. In addition to standard one (1) year warranty on all labor and materials, provide a five (5) year warranty on electronic ballasts for all fluorescent lighting fixtures.

2. **PRODUCTS**

2.1 **GENERAL**

A. All fixtures shall come pre-assembled and complete with all sockets (incandescent to be spring supported), lamp ends, ballasts, transformers, fixture ends, trim rings, plates and low-density mounting kits (as required) for a complete installation.

B. Electrical Contractor shall be responsible for reviewing all mounting arrangements prior to ordering any products. Electrical Contractor shall be responsible for ordering all of the proper fixtures, mounting hardware and misc. for a complete project.

C. All recessed fixtures shall fit tight to ceiling to eliminate all light leaks.

D. Trim kits, when not secured internally to fixture, shall be secured to structure at a minimum of two points.

E. Incandescent and high intensity discharge recessed lighting fixtures are to be furnished with thermal cut outs as required by the NEC.
2.2 FIXTURES

A. As noted on the Drawings

3. EXECUTION

3.1 INSTALLATION

A. Use steel wire hangers fastened to the building structure to support recessed fixtures at diagonal corners (Two corners suspended). Fixtures are to fit tight against construction to eliminate light leaks. Recessed downlights are to be provided with adjustable mounting bars/frames for drywall or lay-in ceilings as required. Fixtures supported by the lay-in ceiling grid are not acceptable.

B. Wall-mounted fixtures shall be mounted plumb with building lines and installed with proper box and cover hardware.

C. Install all surface mounted or suspended lighting fixtures such that the weight of the fixture is supported, either directly or indirectly, by a sound and safe structural member of the building, using adequate number and type of fastenings to assure safe installation. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable. Mount suspended fixtures at 8'-0" to bottom of fixture above finished floor unless otherwise noted on the Drawings.

D. Wire fixtures with fixture wiring of at least 50°C rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.

E. Fixtures in mechanical rooms shall be located to clear piping, ductwork, valves and other equipment.

F. At completion of installation and before turning over to Owner, clean and remove all dirt and smudges from all lighting fixtures including lenses, louvers and reflectors.
SECTION 28 31 11
FIRE ALARM AND DETECTION SYSTEM

1.0 GENERAL

1.1 WORK INCLUDED

A. Contractor:

1. Provide an addressable fire alarm and detection system as shown on the Drawings and specified herein, and as needed for a complete and proper installation, including but not necessarily limited to:
   a. Control panels
   b. Annunciators
   c. Signal devices (horns strobes and combination horn/strobes).
   d. Initiating Devices (smoke, heat and multi-technology detectors).
   e. Pull stations
   f. Door Hold Opens (if applicable)

2. Provide control of smoke dampers (if applicable).

3. Provide monitoring and alarm notification for all HVAC units equipped with duct mounted smoke detectors.

4. Provide monitoring and alarm notification for all supervised fire sprinkler valves and flow switches (if applicable).

1.2 QUALITY ASSURANCE

A. All equipment and components shall be the manufacturer's current model.

B. All materials, appliances, equipment and devices shall be tested and listed by a nationally recognized testing laboratory (NRTL) for use as part of a protected premises protective signaling (fire alarm) system.

C. System shall comply with requirements of authorities having jurisdiction including applicable building, ADA, IBC, and NFPA codes and standards.

1.3 SUBMITTALS

A. The Contractor shall furnish a complete set of Fire Alarm and Detection System Drawings to the Architect/Engineer for review.

1. The Drawings shall show the location of control panel(s), annunciator(s), detection and signaling devices and all other devices as necessary for a complete and proper system. The Drawings shall also include a fire alarm system riser diagram.
B. Product Data:

1. Materials list of items provided under this Section

2. Manufacturer’s specifications and other data needed to prove compliance with the specified requirements;

C. After construction is complete, the Contractor shall provide the Owner/Architect with a set of “as-built” drawings complete with three (3) sets of bound operating and maintenance manuals.

1.4 SYSTEM DESCRIPTION

A. General

1. The System shall comply with all pertinent codes, rules, regulations and laws of the Authority Having Jurisdiction. The System shall comply in all respects with the requirements of the specifications, manufacturer’s recommendations and Underwriters Laboratories Inc. (ULI) listings.

2. Provide certification that the entire system(s) has been inspected and tested, is installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and ULI listings, and is in proper working order. Contractor shall use "Fire Alarm System Certification and Description" as required by Section 1-6.2 of NFPA 72 - 1999 edition.

B. Provide complete fire detection and alarm system consisting of the following:

1. Fire alarm control panel(s).
2. LCD remote annunciator(s).
5. Sprinkler system workflow and valve supervisory switches.
6. Interface with kitchen hood fire suppression systems.
8. Magnetic door hold opens.
9. Elevator recall functions for primary and alternate floors and elevator power shunt trip activation.
10. Connection to a central station. The Owner shall arrange for telephone lines to be terminated as directed by the installing contractor.
11. Booster power supplies (as necessary).
12. Cabling.

C. Sequence of Operations.

1. General 24 VDC NACs: Upon activation of any area smoke detector, heat detector, manual pull station or sprinkler workflow switch, the following functions shall automatically occur:

   1. The internal audible device shall sound at the control panel and remote annunciator.
   2. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
   3. All system activity/events shall be documented in system history and on the system printer (if applicable).
4. Any remote or local annunciator LCD/LED’s associated with the alarm shall be illuminated.
5. Activate notification audible appliances <throughout the building> <fire floor, floor above, & floor below.>
6. Activate visual strobes notification appliances <throughout the building> <fire floor, floor above, & floor below.>. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the “Alarm Silence” is pressed.
7. Transmit an alarm signal to the central station.
8. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
9. All stairwell/exit doors shall unlock throughout the building.
10. All self-closing fire/smoke doors held open shall be released.

2. Duct Smoke Operation: Upon activation of any duct smoke detector, the following functions shall automatically occur:
   1. The internal audible device shall sound at the control panel and remote annunciator.
   2. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
   3. All system activity/events shall be recorded on the system printer and system history file.
   4. Any remote or local annunciator LED’s associated with the alarm shall be illuminated.
   5. Transmit signals to remote annunciators located in <building security desk, the engineer’s office and the building management office.>
   6. Transmit an alarm signal to the central station.
   7. Shutdown the local air handling unit.
   8. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

3. Supervisory Operation: Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
   1. The internal audible device shall sound at the control panel and remote annunciator.
   2. The LCD display shall indicate all applicable information associated with the supervisory condition including; device type, device location and time/date.
   3. All system activity/events shall be documented on the system printer and system history file.
   4. Any remote or local annunciator LCD/LED’s associated with the supervisory activation shall be illuminated.
   5. Transmit a supervisory signal to the central station.

4. Trouble Operation: Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
   1. The internal audible device shall sound at the control panel and remote annunciator.
   2. The LCD display shall indicate all applicable information associated with the trouble condition including; device type, device location and time/date.
   3. All system activity/events shall be documented on the system printer and
4. Any remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.
5. Transmit a trouble signal to the central station.

5. Monitor Activation: Upon activation of any device connected to a monitor circuit, the following functions shall automatically occur:

1. All system activity/events shall be documented on the system printer.
2. The monitor LED will light and pre-programmed functions will activate.

D. System Configuration

1. General
   a. All Life Safety System equipment shall be arranged and programmed to provide a system for the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.
   b. The System shall utilize independently addressed, smoke detectors, heat detectors and input/output modules as described elsewhere in this specification.

2. Initiating Device Circuits
   a. The Initiating device circuits (IDC) used to monitor manual fire alarm stations, smoke and heat detectors, workflow switches, valve supervisory switches, fire pump functions, etc. shall be <Class A (Style "D" or "E")> or <Class B (Style "A" or "B")>.

3. 24 VDC Notification Appliance Circuits
   a. 24 VDC Notification appliance circuits (NAC) shall be <Class A (Style "Z")> or <Class B (Style "Y")>. All notification appliance circuits shall have a minimum circuit output rating of 2 amp @ 24 vdc. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.

4. Signaling Line Circuits
   a. The signaling line circuit shall communicate from a panel/node to analog/addressable detectors, input modules, output modules, isolation modules and notification appliance circuits.
   b. Each signaling circuit connected to addressable/analog devices shall provide a minimum of 20 spare addresses.
   c. When a signaling line circuit covers more than one fire/smoke compartments, a wire-to-wire short shall not effect the operation of the circuit from the other fire/smoke compartments.
   d. The signaling line circuit (SLC) connecting panels and annunciators shall be <Class A (style 7)> <Class B (style 4)>.
   e. The signaling line circuit connecting to addressable/analog devices including, detectors, monitor modules, control modules, isolation modules, and notification circuit modules shall be <Class A (style 6 or 7)> <Class B (style 4)>.

5. DACT
   a. The panel shall have a dialer (alarm communicator transmitter (DACT))
module to transmit alarm, supervisory and trouble signals to a Central Monitoring Station (CMS). The DACT shall support dual telephones lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program using a touch tone phone and password.

2.0 PRODUCTS

2.1 GENERAL

A. To the maximum extent practicable, use only the products of a single manufacturer.

B. Acceptable Manufacturer’s

1. Edwards Systems Technology (EST)

2.2 FIRE ALARM CONTROL PANEL

A. Microprocessor based, addressable, solid state type, with rechargeable batteries and ground fault protection, able to be flush-mounted or surface-mounted, and expandable (via modules).

B. The control panel shall include all required hardware, software and system programming to provide a complete and operational system. The control panel shall assure that life safety takes precedence among all panel activities.

C. The control panel shall include the following capacities:

a. Support up to 380 analog/addressable points per panel (plus additional points via networked panels)

b. Support up to 5 fully supervised network remote annunciators.

c. Support a DACT (dialer) for off premise notification

d. Support up to 576 chronological events in history.

D. The control panel shall include the following features:

a. Provide auto programming and electronic addressing and mapping of analog/addressable devices.

b. Provide an operator interface display that shall include functions required for annunciation, command and control system functions.

c. Provide a discreet system control switch provided for reset, alarm silence, local silence, drill switch, up/down switches, status switch, program switch, enable and disable switches, activate and restore switches, reports switch and test switch.

d. Provide system reports that provide sensitivity and history details.

e. Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords; and autoprogram, enable mapping, restart the system and clear control panel event history file.

f. Provide an authorized operator to perform test functions within the installed system.

E. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel. Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure.
2.3 POWER SUPPLY

A. Each system power supply shall be a minimum of 6 amps @ 24 vdc.

B. Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any alarm, trouble or operator acknowledgment signals.

C. Each system power supply shall be individually annunciated and shall identify the inoperable power supply in the event of a trouble condition.

D. All standby batteries shall be continuously monitored by the system. Low battery and disconnection of battery power supply conditions shall immediately annunciate as a trouble signal, identifying the deficient batteries.

E. All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours maximum.

F. All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of Section 1-5.2 of NFPA 72 - 1999. The AC power circuit shall be installed in conduit raceway. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside the control panel.

2.4 ANNUNCIATOR

A. Provide remote annunciator at main entrance to provide indication of system alarm signals and/or trouble indication. The annunciator shall contain the following system status indicators:
1. 80 character Backlit Liquid Crystal Display.
2. System Power Indicator - green LED.
3. System Common Alarm - red LED.
4. System Common Trouble - yellow LED.
5. System Common Supervisory - yellow LED.
6. System Common Monitor - yellow LED.
7. System Ground Fault - yellow LED.
8. System CPU Fault - yellow LED.
9. System Disabled - yellow LED.
10. System Test Point(s) - yellow LED.
11. System Reset Switch with Integral yellow LED.
12. System Alarm Silence Switch with Integral yellow LED.
13. System Local Silence Switch with Integral yellow LED.
14. System Drill Switch with Integral yellow LED
16. Additional buttons as required to provide system control and operator functions.

B. The system shall be designed and equipped to receive, monitor, and annunciate signals from devices and circuits installed throughout the building.

C. Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control panel(s) and at each remote annunciation device.

D. Annunciator shall be flush or semi-flush mount.
2.5 DIALER - DACT

A. The system shall provide an off premise Digital Alarm Communications Transmitter (DACT) capable of transmitting system alarm, trouble and supervisory events to a central monitoring station (CMS). The DACT shall support dual telephone lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program the DACT using a touch tone phone and password.

2.6 SIGNALING DEVICES

A. Horns:
   a. Provide 2-wire, 24Vdc horn(s) with audible output select for self-synchronizing temporal (Code 3) tone (with use of synchronizing module) or continuous tone. The horn shall provide for three (3) selectable dBA levels for both types of tones.
   b. Horns shall be Series AH by Wheelock Inc.

B. Strobes:
   a. Provide 24Vdc strobe(s) self-synchronized to flash at 1 fps across their full operating voltage range. The strobe shall operate on any existing 2-wire signal circuit. Strobes shall be 15 cd and have a minimum intensity of 75 cd (on axis) to meet A.D.A.
   b. Strobes shall be Series RSS (RSS-241575W-FR) by Wheelock Inc.

C. Combination Horn/Strobe
   b. Horn shall have an audible output select for self-synchronizing temporal (Code 3) tone (with use of synchronizing module) or continuous tone. The horn shall provide for three (3) selectable dBA levels for both types of tones.
   c. Strobes shall be 15 cd and have a minimum intensity of 75 cd (on axis) to meet A.D.A. Strobes shall be self-synchronized to flash at 1 fps.
   d. Horn/Strobe shall be Series AS (AS-241575W-FR) by Wheelock Inc.

2.7 SMOKE DETECTORS

A. Multi-Sensor Technology Smoke Detectors: Provide addressable multi-sensor smoke detectors as follows:

1. Provide multi-sensor technology smoke detectors utilizing at a minimum, the photoelectric light scattering principle for operation integrated with a thermal detector monitoring rate of temperature rise and fixed temperature. Detectors may also use a third means of detection such as the ionization principle. All means of detection shall be integrated and monitored by the fire alarm control panel for the fire signatures to which this detector was designed and tested. Detectors that simply have more than one means to detect fires that are not integrated shall not be used. Smoke detectors shall be listed for use with the fire alarm control panel.

2. Provide self-restoring type detectors that do not require any readjustment after actuation to restore them to normal operation. Detectors shall be UL listed as Smoke-Automatic Fire Detectors.

3. All components shall be rust and corrosion resistant. Vibration shall have no effect on the detector's operation. The detection chamber shall have a fine mesh metallic screen that prevents the entrance of insects or airborne materials. The screen shall not inhibit the movement of smoke particles into the chamber.
4. Provide twist lock bases for the detectors. The detectors shall maintain contact with their bases without the use of springs. Provide companion-mounting base with fixed wiring terminals. Terminate field wiring on the fixed terminals. The detector shall have a visual indicator to show actuation.

5. Detectors shall be equipped with screw terminals for each conductor.

6. The detector address shall identify the particular unit, its location within the system, and its sensitivity setting. Detectors shall be of the low voltage type rated for use on a 24 VDC system.

7. Provide detectors that are rated for the air velocity expected.

B. Duct Smoke Detectors: Provide multi-sensor technology smoke detectors as specified above.

1. Provide detectors with approved duct housing, mounted to the exterior of the duct, and with perforated sampling tubes extending across the width of the duct in accordance with NFPA 90A. For required return air duct detectors that are to be installed at the shaft openings where the return air enters the common return air shaft/system, provide quantities and proper location and spacing of detectors in compliance with NFPA 72 requirements.

2. Provide detectors that are rated for the air velocity expected.

3. Where the installed location of a duct detector is concealed or not easily located, provide a remote LED to indicate the operation and location of the detector.

2.8 HEAT DETECTORS

A. Addressable, self-restoring with rate compensated, fixed temperature sensing, field selectable with or without rate-of-rise temperature sensing.

B. Rate-of-rise temperature detection shall be selectable at 15F or 20F per minute. Fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135F or 155F.

2.9 MULTI-SENSOR DETECTORS

A. General: Provide addressable multi-technology detector that integrates the signals from photo-electric, ionization, and rate compensated temperature sensors into a “fire signature” as follows:

1. All means of detection shall be integrated and monitored by the fire alarm control panel for the fire signatures to which this detector was designed and tested. Detectors that simply have more than one means to detect fires that are not integrated shall not be used. Multi-sensor detectors shall be listed for use with the fire alarm control panel.

2. Provide detectors with screw terminals for each conductor. Provide detectors designed for surface outlet box mounting and supported independently of wiring connections.
3. Where provided in elevator machine rooms for interface with the earthquake recall function, provide detectors that have both a lower temperature rating and a higher sensitivity (often characterized by a lower response time index (RTI)) as compared to the sprinklers located in the elevator machine rooms. A lower RTI is intended to provide detector response prior to sprinkler response.

4. Provide detectors with visual indicator to show that the detector has operated.

2.10 MANUAL PULL STATIONS

A. Provide metal semi-flush mounted, double action, addressable manual stations, which are not subject to operation by jarring or vibration. Stations shall be equipped with screw terminals for each conductor. Stations that require the replacement of any portion of the device after activation are not permitted. Stations shall be finished in fire engine red with molded raised lettering operating instructions of contrasting color. The use of a key or wrench shall be required to reset the station.

2.11 TAMPER SWITCHES

A. Provide tamper switches to replace each existing tamper switch or as required for new systems for fire protection system control valves where indicated on the drawings. Tamper switches shall be UL listed as "Extinguishing System Attachment" for the location and type of valve supervised. Each device shall have at least two sets of contacts so that two different systems may monitor the switch at any given time during renovations and replacements. The device shall contain double pole, double throw contacts. Operation of the switch shall cause a supervisory signal to be transmitted to the FACP upon not more than two complete turns of the valve wheel or a closure of ten percent, whichever is less. Tamper switches shall be equipped with screw terminals for each conductor.

2.12 WATERFLOW DETECTORS

A. Provide a vane type waterflow detector to replace each existing waterflow detector or as required for new systems. Each device shall have at least two sets of contacts so that two different systems may monitor the switch at any given time during renovations and replacements. The device shall contain double pole, double throw contacts. Equip the detector with a pneumatic time delay, field adjustable from zero to ninety seconds. The time delay shall be set initially to 30 seconds for zone/floor waterflow detectors and 45 seconds for riser or main waterflow detectors. The device shall be a UL listed Extinguishing System Attachment rated for the particular pressure and location at which it is installed. Waterflow detectors shall be equipped with screw terminals for each conductor.

2.13 ELECTROMAGNETIC DOOR HOLDERS

A. Where indicated on the drawings, provide magnetic fire door hold open devices. The electromagnetic holding devices shall be designed to operate on 120 VAC, and require not more than 3 watts of power to develop 1.72 bar of holding force. The initiation of any fire alarm shall cause the release of the electromagnetic door holding device permitting the door to be closed by the door closer. The device shall be UL listed based on UL 228 tests.

B. Refer to architectural plans for door locations. Contractor shall coordinate door holders with door hardware manufacturer/supplier.
2.14 CONDUCTORS

A. All initiating circuit, signaling line circuit, AC power conductors, shield drain conductors and grounding conductors, shall be solid copper, stranded or bunch tinned (bonded) stranded copper.

B. All signaling line circuits, including all addressable initiating device circuits shall be 18 AWG minimum multi-conductor jacketed twisted cable or twisted shielded or as per manufacturer's requirements.

C. All non-addressable initiating device circuits, 24 VDC auxiliary function circuits shall be 18 AWG minimum or per manufacturer's requirements.

D. All notification appliance circuit conductors shall be solid copper or bunch tinned (bonded) stranded copper. Where stranded conductors are utilized, a maximum of 7 strands shall be permitted for No. 16 and No. 18 conductors, and a maximum of 19 strands shall be permitted for No. 14 and larger conductors.

E. All audible notification appliance circuits shall be 14 AWG minimum twisted pairs or twisted pairs shielded or per manufacturer's requirements.

F. All visual notification appliance circuits shall be 14 AWG minimum THHN or twisted pairs or twisted shielded pairs or per manufacturer's requirements.

2.15 AUXILIARY POWER: If required, additional signaling device power shall be provided by a power unit that is completely compatible with the main control panel and provides full supervision of the signaling device.

3.0 EXECUTION

3.1 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with pertinent requirements of governmental agencies having jurisdiction, and with the manufacturer's recommendations as approved by the A/E.

C. Contractor shall provide auxiliary power supplies as required to operate Fire Alarm System.

D. The Contractor shall verify and take full responsibility for furnishing and installing the correct size and quantity of conductors and conduit necessary for the alarm system to be operated as specified.

E. All circuits shall be rated power limited in accordance with NEC Article 760.

F. Device Mounting Heights (ADA Compliant)

- Signaling Devices: 80-inches AFF unless noted otherwise
- Pull Stations: 48-inches AFF where only front wheel chair access is available. 54-inches AFF where side wheel chair access is available.
3.2 OPEN CABLE (areas not subjected to mechanical injury i.e above lay-in ceilings).

A. Power-limited cable in accordance with NEC 70, where used, not installed in UL listed metal conduit or raceway shall be mechanically protected by building construction features.

B. All circuits shall be supported by the building structure. Cable shall be attached by straps to the building structure at intervals not greater than 10 feet. Where wiring is installed above drop ceilings, cable shall not be laid on ceiling tiles. Cable shall not be fastened in a manner that puts tension on the cable.

C. Cable type shall be FPLP, FPLR or FPL, or permitted substitutions, selected for the installation application as required by NEC 70, Section 760-61.

D. All cable that is not enclosed by conduit shall be supported and anchored with nylon straps or clamps. The use of staples is prohibited.

3.3 CONDUIT RACEWAY (areas with no ceilings or where exposed to possible damage)

A. Fire alarm wire/conductors shall be installed in conduit in areas with no ceilings or where exposed to possible damage.

B. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture’s recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.

C. All system conduits shall be EMT, 3/4-inch minimum, except for flexible metallic conduit used for whips to devices only, maximum length 6 feet, 3/4-inch diameter, minimum.

D. All system conduits, which are installed in areas, which may be subject to physical damage or weather, shall be IMC or rigid steel, 3/4-inch minimum.

E. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.

F. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or by fire damage, and so as not to interfere with existing building systems, facilities or equipment, and to facilitate service and minimize maintenance.

G. All conduits, except flexible conduit whips to devices, shall be solidly attached to building structural members, ceiling slabs or permanent walls. Conduits shall not be attached to existing conduit, duct work, cable trays, other ceiling equipment, drop ceiling hangers/grids or partition walls, except where necessary to connect to initiating, notification, or auxiliary function devices.

H. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back boxes shall be readily accessible for inspection, testing, service and maintenance.

3.2 TESTING

A. All intelligent analog addressable devices shall be tested for current address, sensitivity, and user defined message.
B. All wiring shall be tested for continuity, shorts, and grounds before the system is activated.

C. The system including all its sequence of operations shall be demonstrated to the Owner, his representative, and the local fire inspector. In the event the system does not operate properly, the test shall be terminated. Corrections shall be made and the testing procedure shall be repeated until it is acceptable to the Owner, his representatives and the fire inspector.

D. At the final test and inspection, a factory trained representative of the system manufacturer shall demonstrate that the system functions properly in accordance with these specifications. The representative shall provide technical supervision, and participate during all of the testing for the system.

E. All fire alarm testing shall be in accordance with National Fire Alarm Code, NFPA 72 - 1999, Chapter 7.

F. A letter from the Contractor certifying that the system is installed entirely in accordance with the system manufacturer's recommendations and within the limitations of the required listings and approvals, that all system hardware and software has been visually inspected and functionally tested by a manufacturer's certified representative, and that the system is in proper working order.