PROJECT MANUAL

for

REEVES TIRE AND AUTO

for

NEW TIRE SERVICE CENTER

Joplin, Missouri

April 5, 2010

Architect

Michael Stephens
Architecture
610 South Wall Avenue
Joplin, MO 64801
(417) 781-4288 ext. 212

Construction Manager

Joplin Construction Design & Management, Inc.
610 Wall Street/ PO Box 1604
Joplin, MO 64801
Tel No.: 417-781-4288
Fax No.: 417-781-4480

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DIVISION 0 BIDDING REQUIREMENTS, CONTRACT FORMS, & CONDITIONS OF THE CONTRACT

00100

INVITATION TO BID

PART 1

1.1 GENERAL

A. The Owner: Reeves Tire
806 East 7th
Joplin, Missouri 64801

B. The Project: Reeves Tire and Auto
New Building, Joplin, MO 64801

C. The Architect: Michael Stephens
610 South Wall Avenue
Joplin, MO 64801
Tel. No: (417) 781-4288 ext. 212

D. The Construction Manager: Joplin Construction Design & Management, Inc.
610 Wall Street
Joplin, MO 64801
Tel No: (417) 781-4288 Fax: (417) 781-4480
email: build@jcdm.com

E. General Description: New building for sales, shop and office. Approximately 9,600 square feet.

F. Bid Date and Location: Sealed Subcontractor and Material Supplier bids will be received until the appointed time at the following location:

Joplin Construction Design & Management, Inc.
610 Wall Street/PO Box 1604
Joplin, Missouri 64801
Tel No: (417) 781-4288
Fax: (417) 781-4480

G. Bid Opening: Subcontractor and Material Supplier bids will be opened in private. Apparent successful bidder will be contacted as soon as possible.

H. Bidding Documents:

1. Bidding Documents will be on file and may be examined in the following locations:

Joplin Construction Design & Management
610 Wall Street/ PO Box 1604
Joplin, Missouri 64801
Tel No: (417) 781-4288

2. Bidding Document copies may be downloaded off the Internet at the following locations:

www.joplinconstruction.com
www.jcdm.com- and click on Plan Room Online link.

3. Bidding Documents may be obtained and examined after 1:00 PM, April 5, 2010, at the following location:

Joplin Construction Design & Management
610 Wall Street/PO Box 1604
Joplin, MO 64801
Tel No: (417) 781-4288

4. Subcontractor Bidders may obtain full sets of Bid Documents can be obtained upon receipt of a refundable deposit, in the amount of $50.00 per set.

a. Make checks payable to Joplin Construction Design & Management.
b. Bidding documents will be mailed or shipped via UPS at Bidder's expense.
c. Deposit will ONLY be refunded if Bid Documents are returned complete and undamaged, within 15 days following the bid closing date & bid bonafide was submitted.

6. Bid Security: Bid Security is not required.
7. Bid Irregularities: The Owner reserves the right to reject any or all bids and to waive any informality or irregularities in any Bid received.
8. Bid Irrevocability: Bids may not be withdrawn for a period of forty-five (45) calendar days from the date of the bid opening.

Part 2
NOT APPLICABLE

Part 3
NOT APPLICABLE

END OF DOCUMENT

DOCUMENT 00200

INSTRUCTIONS TO BIDDERS

PART 1

1.1 CONTRACT DOCUMENTS IDENTIFICATION

A. The Contract Documents are identified as:

Project: Reeves Tire and Auto
New Building-Joplin, MO

as prepared by: Michael Stephens, Architect
610 South Wall Avenue
Joplin, MO 64801
Tel No: (417) 781-4288 ext. 212

1.2 BID SUBMISSION

A. Bid Proposals, addressed to the Construction Manager, signed, executed, and dated will be received by the Construction Manager, at times determined and set by Project Manager

Construction Manager: Joplin Construction Design & Management
610 Wall Street
Joplin, Missouri 64801
Tel No: 417-781-4288
Fax: 417-781-4480

.

B. Amendments to the submitted offer will be permitted if received in writing prior to bid closing and if endorsed by the same party or parties who signed and sealed the offer.

C. No bids received after the time fixed for receiving them will be considered.

1.3 INTENT

A. The intent of this bid call is to obtain offers to perform work for the construction of metal building for Reeves Tire and Auto and is for Stipulated Sum contracts, in accordance with the Contract Documents.

B. The work will be executed by multiple prime contractors, hourly day labor, and unit or negotiated costs.

C. Bids will be accepted in accordance with the several prime contract categories scheduled in Division 01100-Summary of Work.

D. Bidders may bid on more than one category, but each category shall be bid separately.

E. The Work will be coordinated and managed for the Owner by the Construction Manager.

1.4 CONSTRUCTION MANAGEMENT

A. The Owner has awarded a Construction Management contract to:
Joplin Construction Design & Management
610 Wall Street/PO Box 1604
Joplin, Missouri 64801
Tel No: 417-781-4288 Fax: 417-781-4480

B. The Construction Manager will coordinate and schedule the work for the various Sub-Contractors.

1.5 CONTRACT TIME

A. Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

END OF SECTION

DOCUMENT 00410 BID FORM

Date: _____

To: Joplin Construction Design & Management 610 Wall Street] PO Box 1604
Joplin, Missouri 64801
Tel No: 417-781-4288
Fax: 417-781-4480

Project: Reeves Tire and Auto
New Building-Joplin, MO

Submitted by:
(full name and address)

.....

.....

.....

1. OFFER

Having examined the Place of The Work and all matters referred to in the Instructions to Bidders, Bid Documents and Contract Documents prepared by Brady Smith for the above mentioned project, we the undersigned, hereby offer to enter into a Contract to perform the Work of:
(Describe work & Specification Sections included): .....

.....

.....For the

Contract Sum of:

$ .....dollars, in lawful money of the United States of America. All

applicable taxes are included in the Bid Sum.

2. ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for 45 days from the bid closing date. If this bid is

accepted by the Construction Manager within the time period stated above, we will:

a. Execute the Agreement within seven days of receipt of agreement form from the Owner.
b. Furnish the Certificates of Insurance required by the Supplementary Conditions, within ten days of receipt of Notice of Award.
c. Furnish if required the required bonds within ten days of receipt of Notice of Award in the form described in Section 00600-Construction Bonds.
d. Commence work within seven days after receipt of written Notice to Proceed.

If this bid is accepted within the time stated, and we fail to commence the Work [or we fail to provide the required Bond(s),] the security deposit shall be forfeited as damages to the Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which the Contract is signed

.

3. CONTRACT TIME If this bid is accepted, we will:

4. Complete the Work in ( ) Calendar days from Notice to Proceed.

5. OVERHEAD AND PROFIT

The following percentages will be used to determine the dollar amounts for overhead and profit, to be added to the contractor's costs for changes in the Work ordered by the Owner:

For Work performed by Contractor's own forces:
Overhead: _____ percent Profit _____ percent

For Work performed by subcontractor, supervised by Contractor:
Overhead: _____ percent Profit _____ percent

6. ADDENDA

The following Addenda have been received. The modifications to the Contract Documents noted therein have been considered and all costs thereto are included in the Bid Sum.

Addendum No._____ Dated _____

Addendum No._____ Dated _____

7. UNIT PRICES

a. Unit Price for Rock Excavation ..... $

8. BID FORM SIGNATURE(S)

Official Name and Address of Company

Telephone No. _____

Fax. No. _____

Signed _____

Title_____

Date _____

END OF DOCUMENT 00410

DOCUMENT 00520

FORM OF AGREEMENT

The Agreement shall be the Standard Form of Agreement Between Contractor and Sub-Contractor, AIA Document A401, 1997 Edition, a copy of which is on file and may be examined at the office of the Construction Manager and which, when executed, will become a part of the Contract Documents of the successful bidder.

END OF DOCUMENT

AIA DOCUMENT A201-1997

General Conditions of the Contract for Construction

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

This document has been approved and endorsed by The Associated General Contractors of America.

TABLE OF ARTICLES

CAUTION: *You should use an original AIA document with the AIA logo printed in red. An original assures that changes will not be obscured as may occur when documents are reproduced.*

The American Institute
of Architects
1735 New York Avenue, N.W.
Washington, D.C. 20006-5292

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AIA DOCUMENT A201-1997
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 shall, 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 after such seven-day period give 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 yet 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 appropriate 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 expeditious 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 Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove 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 do so 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, 3.5 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 so 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 will 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 other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the 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 either 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 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 these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Paragraph 4.3.

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 Owner until subsequently revised.

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights 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 10.2.5.

6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in 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 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 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. 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 morgages, 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 4.3.

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

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by 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 in Subparagraphs 9.6.2, 9.6.3 and 9.6.4.

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

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

9.7 FAILURE OF PAYMENT

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 by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

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

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

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

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

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

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 care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

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

10.2.2 The Contractor shall 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; and

.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, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with 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.

DOCUMENT 00811

SUPPLEMENTARY CONDITIONS

PART 1

1.1 SUPPLEMENTARY CONDITIONS

A. These Supplementary Conditions amend or supplement the General Conditions of the Contract for Construction AIA A201, 1997 Edition and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

B. The terms used in these Supplementary Conditions which are defined in the General Conditions of the Contract for Construction, AIA A201, 1997 Edition have the meanings assigned to them in the General Conditions.

C. The General Conditions also may be supplemented elsewhere in the Contract documents by provisions located in, but not necessarily limited to, Division 1 of the Specifications.

1.2 AMENDMENTS TO ARTICLE 1 GENERAL PROVISIONS

A. Add Paragraph 1.7 and Subparagraphs as follows:

1.7 DEFINITIONS

1. Products:
   a. Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work
   b. Products may also include existing materials or components required for reuse.
2. Furnish or supply:
   a.. To supply and deliver, unload, inspect for damage.
3. Install:
   b. To unpack, assemble, erect, apply, place, finish, cure,. protect, clean, and ready for use.
4. Provide
   a. To furnish or supply, plus install.
5. Building Code, and Code:
   a. Refer to regulations of governmental agencies having jurisdiction.
6. Approved, Required, and As Directed:
   a. Refer to and indicate the work or materials that may be approved, required, or directed by the Architect acting as the agent of the Owner.
7. Similar.
   a. Means in general sense and not necessarily identical.
8. Shown, Indicated, Detailed, Noted, Scheduled:
   a. Refer to requirements contained in the Contract Documents.

1.3 AMENDMENTS TO ARTICLE 2 OWNER

A. Delete subparagraph 2.2.5 and substitute the following:

1. 2.2.5 The Contractor will be furnished, free of charge, 1 copy of the Drawings and Project Manual, except that shipping charges will be paid by the Contractor. Additional sets will be furnished at the cost of reproduction, shipping and handling.

1.4 AMENDMENTS TO ARTICLE 3 CONTRACTOR

A. At paragraph 3.4 Labor and Materials, add subparagraphs as follows:

1. 3.4.4 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in Section 01600 Products and Equipment.
2. 3.4.5 By making requests for substitution based on Subparagraph 3.4.5 above, the Contractor:
   a. represents that the contractor has personally investigated the proposed substitute product and determined that is equal or superior in all respects to that specified;

b. represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
c. certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs; and waives all claims for additional costs related to the substitution which subsequently become apparent; and
d. will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

3. At paragraph 3.5 Warranty, add subparagraphs as follows:
   a. 3.5.2 The warranty period shall be one calendar year commencing at time of Substantial Completion.
   b. 3.5.3 The Contractor will, at his own expense, repair and replace all such defective work, and all other work damaged thereby which become defective during the term of the Guarantee-Warranty. 3.5.4 Secure additional warranties as required by the Contract Documents from Subcontractors addressed to and in favor of the Owner. Deliver copies of same to Construction Manager upon completion of work.
4. At paragraph 3.6 Taxes: Add the following subparagraph:
   a. 3.6.2 The Contractor shall accept and assume liability for timely compliance with the payment of all assessments and taxes under State and Federal social security laws, unemployment insurance, and other similar laws which otherwise might impose liability on the Owner in connection with the work.
5. At paragraph 3.12 Shop Drawings, Product Data, and Samples, add subparagraph 3.12.11 as follows:
   a. 3.12.11 Where the specifications require materials or appliances to be installed in accordance with the manufacturer's specifications, instructions, or directions and such instructions have been approved by the Architect as complying with the intent of the Specifications, they will be considered as part of the Specifications and shall be carefully followed in the execution of the Work. Labor and materials required to comply with the manufacturer's instructions shall be provided as part of the Contract Sum.

1.5 AMENDMENTS TO ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

A. Add the following sentence to end of subparagraph 10.1.1:
   1. The Work of this Contract includes asbestos abatement in specific areas as scheduled.

1.6 AMENDMENTS TO ARTICLE 11 INSURANCE AND BONDS

A. Modify paragraph 11.1 Contractor's Liability Insurance as follows:
   1. Add the following clauses 11.1.1.8 and 11.1.1.9 to 11.1.1:

B. 11.1.1.8 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:
   1. Premises-Operations.
   2, Independent Contractors' Protective.
   3. Products and Completed Operations.
   4, Contractual Liability, including specified provision for Contractor's obligation under Paragraph 3.18 Owned, non-owned, and hired motor vehicles.
   5. Broad Form Property Damage including Completed Operations.

C. 11.1.1.9 If the General Liability coverage’s are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverage’s required to be maintained after final payment, certified in accordance with Subparagraph 9.10.2

D. Add the following clause, 11.1.2.1 to 11.1.2
   1. 11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following limits, or greater if required by law: The Owner may require coverage’s greater than the limits specified below. Additional premiums required as a result of such additional coverage will be added to the Contract Sum,

a. Workers Compensation and Occupational Disease Statutory
b. Public Liability and Property Damage
   1. Bodily Injury
      $500,000.00 Each Occurrence
      $1,000,000.00 Aggregate
   2. Property Damage
      $250,000.00 Each Occurrence
      $500,000.00 Aggregate
c. Business Auto Liability (including owned, non-owned and hired vehicles)
   1. Bodily Injury
      $500,000.00 Each Person
      $1,000,000.00 Each Occurrence
   2. Property Damage
      $500,000.00 Each Occurrence

C. Add the following sentence to subparagraph 11.1.3
   1. If this insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705. If this insurance is written on a Commercial General Liability policy form, ACORD form 25S will be acceptable.

END OF SECTION

DIVISION 1 GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK UNDER THIS CONTRACT:

A. Construction and completion of A New Building to be located at 806 East 7th, Joplin, Missouri for: Reeves Tire and Auto, Joplin, Missouri under a single lump sum contract.

1.2 OWNER:

A. For purposes of the contract for construction for the above mentioned project, the Owner is Reeves Tire and Auto, Joplin, MO.

1.3 INDEMNITY:

A. The Contractor shall hold the Owner harmless from any and all damages and claims that may arise by reason of any negligence on the part of the Contractor, his agents, employees, or subcontractors, in the performance of this contract; and in case any action is brought therefore against the Owner or any of its agents, employees or subcontractors, the Contractor shall assume full responsibility for the defense thereof, and upon Contractor's failure to do so on proper notice, the Owner reserves the right to defend such action and to charge all costs thereof to the Contractor. The carrying of the insurance required herein shall not relieve Contractor of the duty of indemnity in the event that such insurance shall be inadequate, for any reason, to protect Owner in full.

1.4 ALLOWANCES

A. In accordance with Article 3.8 of "General Conditions of the Contract for Construction", except as modified below, include the following allowance(s) in the Contract Sum:
   1. No allowances in this project.

1.5 CONTRACTOR USE OF PREMISES

A. Confine operations at site to areas permitted under Contract. Portions of site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting work while engaged in project construction.
B. Keep existing driveways and entrances serving premises clear and available to Owner and his employees at all times. Do not use these areas for parking or storage of materials.
C. Do not unreasonably encumber site with materials or equipment. Confine stockpiling of materials and location of storage shed to areas indicated. If additional storage is necessary obtain and pay for storage off site.
D. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, to prevent unauthorized use. Do not leave vehicles or equipment unattended with motor running or ignition key in place.
E. Open fires will not be permitted within building enclosure or on premises.

1.6 DRAWINGS

A. The drawings are diagrammatic and shall not be scaled for determination of dimensions. Where specific dimensions are not shown on the drawings and are required by the Contractor, the Contractor shall contact the Architect for further information concerning the dimension.
B. Where conflicts are found to exist on any of the drawings, the most stringent requirement will be enforced unless otherwise directed by the Architect.

1.7 CODE REQUIREMENTS

A. All construction shall conform to all requirements of the following codes and standards:
   1. ICC International Building Code, 2006 edition.
   2. ICC International Plumbing Code, latest edition.
   3. ICC International Mechanical Code, latest edition.

4. NFPA 70, National Electric Code, latest edition.
5. NFPA 101, Life Safety Code, 1996 edition.

1.8 INDUSTRY STANDARDS

A. Applicability of Standards: Except where more explicit or stringent requirements are written into the contract documents, applicable construction industry standards have the same force and effect as if bound into or copied directly into the contract documents. Such industry standards are made a part of the contract documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at project site for reference.

B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding

D. Copies of Standards: The Contract Documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the work. Copies of applicable standards are not bound with the contract documents. Where copies of standards are needed for proper performance of the work, the Contractor is required to obtain such copies directly from the publication source.

E. Abbreviations And Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other contract documents they are defined to mean the recognized name of the trade association, standards generating organization, governing authority, or other entity applicable to the context of the text provisions. The word "provide" as used on the drawings and in the specifications means to furnish and install.

1.8 PROJECT MEETINGS

A. Pre-construction Meeting: Within 15 days after execution of agreement, the Contractor shall prepare an agenda and schedule a pre-construction meeting. Written notice of meeting date, time and place, and agenda items shall be sent to the Owner, Architect/Engineer, and all major Sub-Contractors.

B. Progress Meetings: The Contractor shall schedule and hold regular progress meetings to coordinate, expedite and schedule work of all contracts. Hold additional meetings as progress of work dictates or when requested by the Architect. Send written notice of meeting date, time and place, and agenda of meeting to the Owner, Architect/Engineer, subcontractors, and others as pertinent to agenda. Record results of meetings and distribute copies to everyone in attendance and to others affected by the decisions or actions resulting from each meeting.

1.9 OCCUPANCY PERMIT

A.. After completion of the construction, the Contractor shall obtain from the Building Official, a Certificate of Occupancy for the project.

1.10 OWNER FURNISHED MATERIALS

A. Items noted 'NIC' (Not in Contract) and furnishings will be furnished and installed by the Owner after Substantial Completion unless indicated otherwise.
   1. The Contractor shall be responsible for designating the delivery date for Owner furnished items in the Construction Schedule.
   2. Owner will furnish to the jobsite, materials and equipment or items listed, for delivery in accordance with the Contractor's Construction Schedule.
   3. Owner will inspect deliveries for damage and arrange for any necessary replacement or repair.
   4. Contractor shall be responsible for receiving, unloading, handling, storage and protection of all Owner furnished items delivered to the site.
   5. Contractor shall furnish fasteners and all other materials or miscellaneous items necessary for the installation of any Owner furnished items which are indicated to be installed by the Contractor.

B. Schedule of items to be furnished by Owner (with responsibility for installation indicated):
   1. Sound and video equipment (Owner). Stub ups by PME Contractor

2. Security systems (Owner).
3. Phone, Communications and Data (computer network) Equipment (Owner). Stub up by PME Contractor
4. Vehicle Lifts-Alignment Equipment. (Owner) PME Services to by PME Contractor, final electrical connection by Electrical Contractor, final air connection by (Owner)
5. Tire changing and balancing equipment. (Owner) PME services to by PME Contractors, NEMA receptacle by Electrical Contractor, final air connection by Owner
6. Compressor. (Owner) PME services to by PME Contractor, final electrical connection by Electrical Contractor, final air connection by Owner.
7. Tire storage racks: (Owner)
8. Compressed air line filters, separators, oilers and quick connects (Owner)

PART 2 PRODUCTS
Not Applicable

PART 3 EXECUTION
Not Applicable

END OF SECTION

SECTION 01020

BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Project Coordination: Review of Contract Documents, Coordination, field engineering, equipment electrical characteristics and components, examination, preparation, cutting and patching.
B. Quality Control: Quality assurance - control of installation, Tolerances, Inspection and testing laboratory services, Manufacturers' field services and reports.
C. Material and Equipment: Products, transportation, handling, storage, and protection.
D. Starting of Systems: Starting systems, adjusting and balancing.
E. Documents: Project record documents, warranties.

1.2 REVIEW OF CONTRACT DOCUMENTS

A. Perform field measurements and verify field conditions before commencing any construction activities.
B. Carefully study and compare the Contract Documents with each other, with field measurements and conditions, and with any information supplied by the Owner or otherwise known to the Contractor. Report immediately to the Architect, any errors, inconsistencies or omissions discovered.
C. Do not proceed with any construction operations or activities which involves a known error, inconsistency or omission in the Contract Documents before notification to the Architect and issuance of further instructions by the Architect.

1.3 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various sections of specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.
B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.
C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.
D. In finished areas, conceal pipes, ducts, and wiring within the construction.

1.4 FIELD ENGINEERING

A. Employ an experienced instrument technician to locate a reference datum and protect survey control and reference points.
B. Establish elevations, lines, and levels and certify that elevations and locations of the Work conform with the Contract Documents.
C. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

1.5 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Motors: NEMA MG1 Type; specific motor type is specified in individual specification sections.
B. Wiring Terminations: Terminal lugs to match branch circuit conductor; size terminal lugs to NFPA 70.
C. Cord and Plug: Minimum 6 foot (2 m) cord and plug including grounding connector; cord of longer length is specified in individual sections.

1.6 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
B. Verify that utility services are available, of the correct characteristics, and in the correct location.

1.7 PREPARATION

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

1.8 CUTTING AND PATCHING

A. Employ a skilled and experienced installer to perform cutting and patching of new and existing Work; restore Work with new Products.
B. Submit written request in advance of cutting or altering structural or building enclosure elements.
C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in the Work for penetrations of mechanical and electrical Work.
A. Cut masonry and concrete materials using masonry saw or core drill. Restore Work with new Products in accordance with requirements of Contract Documents.
D. Fit Work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
E. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
F. Refinish surfaces to match adjacent finishes.

1.9 QUALITY ASSURANCE - CONTROL OF INSTALLATION
A. Employ only sub-contractors who are familiar with and experienced in techniques, standards and governing codes for construction of this type project.
B. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
C. Comply with manufacturers' instructions.
D. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.10 TOLERANCES
A. Monitor fabrication and installation tolerance control of installed Products over suppliers, manufacturers, Products, site conditions, and workmanship, to produce acceptable Work. Do not permit tolerances to accumulate.
B. Comply fully with manufacturers' tolerances.

1.11 INSPECTION AND TESTING LABORATORY SERVICES
A. Owner will appoint and employ services of an independent firm to perform inspection and testing. Contractor shall pay for services as specified in Section 01010.
B. The independent firm will perform inspections, tests, and other services as required.
C. Cooperate with independent firm; furnish samples and assistance as requested.
D. Re-testing required because of non-conformance to specified requirements will be charged to the Contractor.

1.34 MANUFACTURERS' FIELD SERVICES AND REPORTS
A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions and to initiate instructions when necessary.
B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

1.35 PRODUCTS
A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.

1.36 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION
A. Transport, handle, store, and protect Products in accordance with manufacturer's instructions.

1.37 STARTING SYSTEMS
A. Provide seven days notification prior to start-up of each item.

B. Ensure that each piece of equipment or system is ready for operation.
C. Execute start-up under supervision of responsible persons in accordance with manufacturers' instructions.
D. Submit a written report that equipment or system has been properly installed and is functioning correctly.

1.38 ADJUSTING AND BALANCING
A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.39 PROJECT RECORD DOCUMENTS
A. Maintain on site one set of Contract Documents to be utilized for record documents.
B. Record actual revisions to the Work. Record information concurrent with construction progress.
C. Specifications: Legibly mark and record at each Product section a description of actual Products installed.
D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction.

1.40 WARRANTIES
A. Provide duplicate notarized copies.
B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
C. Submit prior to final Application for Payment.

PART 2 PRODUCTS
Not Used.

PART 3 EXECUTION
Not Used.

END OF SECTION

SECTION 01035

MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.2 NOT USED

1.3 CHANGE ORDER PROPOSAL REQUESTS

A. Owner – initiated Proposal Requests: Proposed changes in the work that will require adjustment to the Contract Sum and/or Contract Time will be issued by the Owner's Construction Manager, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.

1. Proposal request issued by issued by the Owner's Construction Manager are for information only. Do not consider them as instruction either to stop work in progress , or to execute the proposed change.
2. Unless otherwise indicated in the proposal request, submit to the Owner's Construction Manager, an estimate of the cost necessary to execute the proposed change within 5 days of receipt of the proposal request.
    a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.
    c. Include a statement indicating the effect the proposed change in the work will have on the Contract Time and related cost for time extensions..

B. Contractor-Initiated Change Order Proposal Requests; When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Owner's Construction Manager for review.

1. Include a statement outlining the reasons for the change and the effect of the change on the work. Provide a complete description of the proposed change. Indicate the effect the proposed change on the Contract Sum and Contract Time.
2. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.
4. Comply with requirements in Section 01631 "Product Substitutions" if the proposed change in the work requires the substitution of one product or system for a product or system specified.
5. The Owner's Construction Manager shall review the Contractor's Change Order Proposal request with the Owner, and submit a written response to the Contractor within 10 days of receipt of the proposal request.
6. Proposal Request Form: The Construction Manager will issue Joplin Construction & Design, Inc.'s proposal request form with each contract issued or as the need arises.

1.4 NOT USED

1.5 CONTRACT ADJUSTMENTS

A. Adjustments, if any, in the amount to be paid the Contractor by reason of the modifications of the work as set forth in the Contract Change Order, or Construction Change Directive, shall be determined by one or more of the cost adjustment methods outlined in the General Conditions.

1.6 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Proposal Request, the Owner's Construction Manager will issue a Change Order for the signatures of the Owner and Contractor.

B. No work that is part of an submitted change order will be commenced until said change order has been signed approved by the owner and Construction Manager and a signed copy of the approved Change Order is issued to the Contractor except as noted below.

1. Immediate Change Approvals:

a. Immediate Change Approvals will only be issued when failure to do so affects the work flow or impedes and/or affects the work of other contractors or when failure to do so may subject the Owner to higher costs due to price increases, volume discounts and/or shipping by suppliers.

a. All Immediate Change approvals that are agreed to by the Owner and/or Construction Manager, shall be in writing and signed by the Owner and/or Construction Manager on the Construction Managers Immediate Change Approval Form.

b. No payment will be made on the basis of the Immediate Change form. Payment of said change to be withheld until all appropriate Change Order paperwork is completed and signed.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01290

PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General and Supplementary Conditions.
B. Payment Procedures

1.2 PAYMENT PROCEDURES

A. Submit three (3) copies of each application on AIA form G702 and G703
B. Content and format: Utilize Schedule of Values for listing items in Application for Payment. Provide dollar value in each column for each line item representing portion of work performed.
C. The payment period shall be monthly.
D. The sequence of applications for payment shall be on a regular basis and each application shall be consistent with previous applications and payments.
E. A list of sub-contractors to be paid out of the current application for payment shall be included with the application.
F. Lien Waivers from each sub-contractor and/or supplier which was paid on the last application shall be submitted with each application for payment and shall be signed and notarized. The standard Lien Waiver form used shall be as selected by the Architect.
G. Applications for payment shall reflect only the current Work in place and materials or equipment suitably stored at the site.
H. The Contractor shall warrant that title to all Work covered by an Application for Payment shall pass to the Owner no later than the time of payment.
I. Payment procedure:
    1. On no later than the 20th of each month, sub-contractors shall submit to the Contractor a complete, signed and notarized Application for Payment.
    2. On no later than the 25th of each month, the Contractor shall submit to the Architect an Application for Payment, signed and notarized and indicating the amount due the Contractor.
    3. On no later than the 15th of each month, the Contractor shall issue progress payments to the sub-contractors, unless prior arrangements are made prior to bidding.
J. Payments shall be made in accordance with the Contract Documents to the extent of 90% of the value of the work completed with 10% being retained until project completion unless prior arrangements are made prior to bidding.
K. Initial Application for Payment: Administrative actions and submittals that shall proceed or coincide with the first Application for Payment include the following:
    1. Schedule of Values.
    2. Contractor's construction schedule.
    3. List of sub-contractors and suppliers.
    4. Copies of building permits and other authorizations and licenses from governing authorities.
    5. Initial progress report.
L. Application for Payment at Substantial Completion: After issuance by the Architect of the Substantial Completion Certificate, either full or partial, submit an Application for Payment requesting partial payment of retainage. The Architect will determine the amount of retainage to be released.
M. Final Application for Payment: Administrative actions and submittals that shall proceed or coincide with the final Application for Payment include the following:
    1. Completion of Project Closeout requirements.
    2. Completion of items specified in "Punch List" issued at Substantial Completion.
    3. An affidavit that all payrolls, bills for materials and equipment and any other indebtedness connected with the Work for which the Owner might in any way be responsible, have been paid or otherwise disposed of in a manner acceptable to the Owner.
    4. A final Waiver of Lien.
    5. Receipt by the Architect of Record Drawings.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 01300

SUBMITTALS AND SUBSTITUTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Provide submittals, including shop drawings, product data, samples, schedules, reports and requests for substitutions, as required by Bidding and Contract Documents in strict accordance with provision of this section.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Contractual Requirements for Submittals: General Conditions and Supplementary General Conditions.

B. Individual submittals required by other pertinent specifications sections of the Project Manual.

PART 2 PRODUCTS

2.1 SUBSTITUTIONS

A. The naming of specified items on drawings or in specifications means that such named items are specifically desired by Architect and/or Owner. If the words "or approved equal" or "or acceptable equal" follows such named items, then substitution requests may be submitted.

B. Complete data must be submitted on proposed substitutions. Include product and technical information with specific items and components identified. Indicate differences between proposed item and specified item (materials, installation/erection/application, warranties, etc), and samples for comparison and tests. Note: Incomplete data will not be reviewed.

C. The Architect is the sole judge as to equality and acceptability of proposed substitutions. *ONLY WRITTEN ACCEPTANCES WILL BE HELD VALID BY THE ARCHITECT.*

D. Submit any request for substitution of products by manufacturers not named, not less than 7 days prior to date for receipt of bids. Approved substitutions will be listed in Addenda.

E. If substitutions will affect a correlated function, adjacent construction, or work of other trades or contractors, necessary changes and modifications to affected work will be considered as part of the substitution, to be accomplished without additional cost to Owner, if and when accepted.

F. Under no circumstances shall Architect's acceptance of such substitution relieve Contractor from timely, full and proper performance of the Work.

2.2 SHOP DRAWINGS

A. Submit required shop drawings drawn to a scale sufficiently large to show pertinent features of item and it's method of connection to work. Submit related shop drawings together; partial submittals will not be accepted. Reproductions of contract documents in any form for use as shop drawings will not be permitted. Provide manufacturer's name and model number of prefabricated items and indicate methods of attachment and clearances required relative to other trades affecting all elements of work. Identify deviations from Contract Documents (if any), check dimensions, check that trades have been coordinated and that no conflict will develop in this in this installation. After reviewing shop drawings, indicate Contractor's approval by signing and dating on Contractor's stamp. Failure to follow these procedures will result rejection of submission and no additional contract time will be allowed for delay from this cause.

B. Submit five prints of Contractor's stamped and approved shop drawings for Architect's review. The Architect will review the prints and stamp with indication of action as appropriate. The Architect will return three copies of the reviewed and stamped prints to the Contractor. For prints returned "Not Approved" or "Revise and Resubmit", correct the original drawings, make a new set of five prints and resubmit. For prints returned "Checked" or "Checked as Corrected", correct original drawings and provide such number of prints as may be needed for field distribution.

2.3 PRODUCT DATA AND SAMPLES

A. Submit 5 copies of product data for Architect's review for items specified in the various specification sections

(copies for mechanical and electrical data is specified in Divisions 15 and 16). Submit samples, where specified, along with product data. Make all submissions affecting color selection within 30 days after signing the contract. Mark data clearly to indicate exact items submitted and note deviations from Contract Documents (if any). After reviewing the submittals, indicate approval by signing and dating on the Contractor's stamp and submit to the architect for review.

2.4 PROGRESS SCHEDULE

A. Within 7 days after Notice to Proceed, submit to the Architect a bar-chart type progress schedule indicating a time bar for each trade or operation of work to be performed at the site. Time bar shall demonstrate planned work, properly sequenced and intermeshed for expeditious completion of the work.

B. Submit with bar-chart tabulation (by date) of all submittals required either by date period relation in Contract Documents or as necessitated by lead time related to individual time bar shown on progress schedule for the associated work. At Contractor's option, submittal dates may be shown on bar-chart schedule in lieu of being tabulated.

C. Submit monthly updates of bar-chart accurately depicting actual progress to the first day of month. Indicate percentage of completion on time bars at 10% increments.

D. Submit progress schedule on reproducible stock.

E. Distribute progress schedule including all updates to Architect, Owner, subcontractors, suppliers, fabricators and others with a need to know schedule compliance requirements. Post a copy in the field office.

2.5 MANUAL

A. Upon completion of the work and prior to final payment, submit to the Architect a loose leaf hard cover binder with the project name printed on it, containing five indexed sections as follows:

B. Subcontractors: A listing of all subcontractors for the project, including portions of the work done, address and telephone number of the firm, and contact at the firm familiar with the project.

C. Guarantees and Warranties: One fully executed copy of each guarantee and warranty specified.

D. Certificates: One fully executed copy of each certificate specified.

E. Instructions: One operating, service and maintenance manual or instruction sheet for each item specified.

F. List of As-built Drawings, Record Drawings, Shop Drawings, Product Data and Samples.

G. Materials and Tools: List of spare parts, extra overrun stock, maintenance tools and devices, keys and similar physical units submitted as specified.

2.6 DRAWINGS AND SUBMITTALS PACKAGE

A. Upon completion of the work and prior to final payment, submit to the Architect a package labeled with the project name and containing one set of reproducible final record drawings and specifications, one copy of final shop drawings, product data and samples (see AIA A201 paragraph 3.11.1). This package and the manual will be presented to the Owner by the Architect upon completion of the project. In addition, submit one set of record drawings to be retained by the Architect.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. Completely identify each submittal and re-submittal by showing at least the following information.

B. Name and address of submitter, plus name and address of the individual who may be contacted for further information.

C. Name of project as it appears on the Contract Documents.

D. Drawing number and specification section number to which the submittal applies.

E, Whether this is an original submittal or a re-submittal.

3.2 TIMING OF SUBMITTALS

A. General: Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and re-submittal and for placing orders and securing delivery.

B. Delays: Costs of delays due to late submittals may be back-charged as necessary and shall not be borne by the Owner.

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Construction Management
- B. Progress Meetings
- C. Job Site Coordination & Administration
- D. Referenced Documents
- E. Mechanical and Electrical Coordination

1.2 CONSTRUCTION MANAGEMENT
- A. The Contractor shall coordinate and manage all of the work of the various sub-contractors, hourly labor and material suppliers.
- B. Cooperation:
  1. Each sub-contractor shall cooperate with the Contractor and with all of the other sub-contractors and interface their work with the work of the other sub-contractors.
  2. Each trade shall afford to the other trades reasonable opportunity to perform their work.

1.3 PROGRESS MEETINGS
- A. The Contractor shall schedule, direct and administer periodic progress meetings throughout the progression of the work at maximum monthly intervals.
- B. The Contractor shall preside at the progress meetings, record minutes and distribute copies to all parties which are affected.
- C. Progress meeting requirements:
  1. Location: Job site field office.
  2. Attendance:
     a) Contractor.
     b) Sub-contractors and material suppliers as pertinent to agenda.
  3. Minimum agenda items to be reviewed and discussed:
     a) Work progress since previous meeting.
     b) Field observations, conflicts and problems.
     c) Construction schedule progress.
     d) Any corrective measures necessary to maintain quality standards and construction schedule progress to job completion.

1.4 JOB SITE COORDINATION AND ADMINISTRATION
- A. Contractor shall coordinate scheduling, submittals and the work of the various sub-contractors to ensure efficient and orderly work sequence and installation of interdependent construction elements.
  1. Where installation of one part of the work is dependent on the installation of other components, either before or after its own installation, schedule construction activities in a sequence which will provide the best results.
  2. Where availability of space is limited, coordinate installation the various components to provide maximum accessibility for maintenance, service, repair and also compliance with codes and regulations.
  3. Make necessary provisions and arrangements to accommodate items or components for subsequent installation.
- B. The Contractor shall employ and maintain on the job site, during the progress of the work, a competent superintendent satisfactory to the Architect. Each sub-contractor shall employ and maintain on the job site a competent foreman.
- C. The job site superintendent shall not be changed without the consent of the Architect unless the superintendent ceases to be employed by the Contractor.
- D. The Contractor shall have the authority to remove any sub-contractor or person from the project for any improper conduct or poor performance if deemed necessary for the welfare of the project. If such action is

taken by the Contractor, same shall be without recourse against the Contractor, Owner or Architect.

E. Cleaning and Trash Disposal: Contractor shall provide daily cleanup of the spillage and debris resulting from construction operations which shall be deposited in a dumpster which will be provided by the Contractor.

1.5 REFERENCED DOCUMENTS

A. Should any referenced document or standard be found to conflict with the Contract Documents, the Contractor shall request in writing from the Architect a clarification before proceeding with the Work.

1.6 MECHANICAL AND ELECTRICAL COORDINATION

A. Contractor shall verify before beginning his work that utility service requirement characteristics of operating equipment are compatible with available building utilities.

B. The Contractor shall verify and coordinate space requirements and installation of mechanical and electrical work which is indicated diagrammatically on the drawings. Follow routing shown for pipes, ducts, conduit, etc as closely as possible.

C. In finished areas, conceal pipes, ducts, conduits, wiring, etc within the construction.

1.7 GENERAL INSTALLATION PROVISIONS

A. Contractor shall require the installer of each individual component to inspect the conditions under which his work is to be performed and the substrate to which in will be attached. Do not allow the work to proceed until such conditions and substrate have been accepted by the installer as ready and requiring no corrective work.

B. Comply with all product manufacturer's installation instructions or recommendations to the extent that any such instructions or recommendations are more stringent than any requirements of the Contract Documents.

C. Contractor shall provide all attachment and devices or methods necessary for permanently securing the work. Secure true to line and level or plumb. Allow for any building expansion or movement as could reasonably be expected.

D. Contractor shall provide uniform and even joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer any questions concerning joint layout or location to the Architect for final direction.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Regulatory Requirements.

1.2 REGULATORY REQUIREMENTS

A. Building Laws: Comply with all local, state and federal building laws, codes and regulations. Notify the Architect promptly upon discovery of any conflict or variance between the drawings or specifications and any such laws, codes or regulations.

B. Labor Laws: Conform to the requirements of any general laws and of any local, state or federal safety regulations pertaining to protection of workers, etc.

C. Hazardous Communication Standard: Maintain a written Hazardous Communication Standard Program in accordance with OSHA regulations. Program must include Materials safety Data Sheets and Chemical Information List.

D. Do not incorporate materials or products containing asbestos or any other hazardous materials in the Work of this contract.

E. Asbestos Abatement: If any existing materials containing asbestos are encountered during the Work of this contract, notify the Architect promptly and immediately cease operations in the affected area until suitable abatement procedures have been completed.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. General Conditions
- B. Supplementary Conditions
- C. Testing Laboratory Services
- D. Contractors Quality Control
- E. Tolerances

1.2 TESTING LABORATORY SERVICES
- A. Construction Manager will employ and pay at the Owner's expense, the services of an independent laboratory, approved by the Owner, to perform inspection and testing
  1. Employment of testing laboratory does not relieve Sub-Contractor of his obligation to perform work in accordance with the Contract Documents.
- B. Testing Laboratory Qualifications:
  1. Meet American Council of Independent Laboratories "Recommended Requirements for Independent Laboratory Qualification".
  2. Meet ASTM E 329 "Recommended Practice for Inspection and Testing Agencies", for Concrete, Steel, and Bituminous materials as Used in Construction.
- C. Laboratory Duties:
  1. Cooperate with Owner, Architect, and Construction Manager. Provide qualified personnel after due notice.
  2. Perform specified inspections, sampling, and testing of materials to ascertain compliance or non-compliance with requirements of the Contract Documents.
  3. Notify the Architect and Construction Manager immediately of observed irregularities of deficiencies of the work.
  4. Submit a written report of each test and inspection; Two copies each to the Architect and to the Construction Manager. Each report to include the following;
     a. Date issued.
     b. Project title and project number.
     c. Testing Laboratories name, address and telephone number.
     d. Name of inspector.
     e. Date and time of sampling or inspection.
     f. Record of temperature and weather conditions.
     g. Date of test.
     h. Location of sample or test in Project.
     i. Type of inspection.
     j. Results of test and indication of compliance or non-compliance with Contract Documents.
  5. Perform additional test when required by the Architect or Construction Manager.
  6. Laboratory is not authorized to:
     a. Release, revoke, alter or enlarge on the requirements of the Contract Documents
     b. Approve or accept any portion of the work.
     c. Perform any duties of the Contractor.
- D. Testing requirements:
  1. Provide earthwork testing as required by Section 02200.
  2. Perform concrete testing as indicated in Section 03001
- E. Construction Manager's and Sub-Contractors Responsibilities
  1. Cooperate with Laboratory personnel, provide access to work.
  2. When materials require testing prior to being incorporated into the work, secure and deliver to Laboratory adequate quantities of representative samples of materials proposed to be used.
  3. Furnish product mix design and samples as requested.

4. Notify testing firm in advance of operations to allow scheduling of testing laboratory personnel and tests.
5. Correct work which is defective or which fails to conform to Contract Documents.
6. Furnish incidental labor and facilities;
    a. To provide access to work to be tested
    b. To obtain and handle samples at the site or at source of product to be tested.
    c. To facilitate inspections and tests.
    d. For safe storage and curing of test samples.

1.3 CONSTRUCTION MANAGERS QUALITY CONTROL

A. Provide inspections, tests and other quality control services as indicated in the individual Specification Sections, and as required by governing authorities, except as explicitly indicated herein, to be the Owner's responsibility.

B. Monitor quality control over suppliers manufacturers, products, services, site conditions and workmanship, to produce Work of specified quality.
    1. When specified in individual specifications, require material or product suppliers or manufacturers to provide design data and calculations. When required by the specifications, prepare such data under the directions of a professional engineer, licensed in the state in which the project is located.
    2. When specified in the individual specification sections, require material or product suppliers or manufacturers to provide test reports and certifications indicating that the material or product meets the specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Comply with manufacturers' instructions.
    1. When specified in the individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, startup, adjusting and finishing, in quantities specified for Product Data.

D. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.

E. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, or startup of equipment as applicable and to initiate instructions when necessary.
    1. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers'' written instructions.

1.4 TOLERANCES

A. Monitor tolerance control of installed products over suppliers, manufacturers, products, site conditions, and workmanship, to produce acceptable work. Do not permit tolerances to accumulate.

B. Comply fully with manufacturers' tolerances.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Provide temporary utilities and miscellaneous facilities required during construction, complete, maintenance and removal.

PART 2 PRODUCTS

2.1 UTILITIES

A. Temporary Utilities: Provide and pay for costs for gas, water and electricity required for this work. Make necessary arrangements with utility companies for temporary service.
   1. Gas and water:
      a. Provide necessary temporary piping and fittings.
   2. Electricity:
      a. Provide necessary temporary electric wiring. Provide area distribution boxes so located that individual trades may use their own construction type extension cords to obtain adequate power and lighting for construction operations.
   3. Telephone:
      a.. Provide telephone in the field office.
      b. Pay costs for temporary service.
      c. Provide fax machine in the field office if requested by the Architect.

2.2 TEMPORARY SANITARY FACILITIES:

A. Provide on-site temporary toilet facilities for use of construction personnel; maintain in a sanitary condition. Comply with applicable codes and regulations of authorities having jurisdiction.

2.3 FIELD OFFICE AND SHEDS:

A. Provide field office and storage facilities adequate in size and accommodations for Contractor's offices, superintendent's office and supply and tool rooms. Make the field office available to the Architect throughout the entire construction period.

2.4 PROJECT IDENTIFICATION

A. Provide project identification sign, to be located as directed by the Architect. No signs or advertisements will be allowed to be displayed without written approval of the Architect.

B. Sign to be not less than 32 sq. ft., with painted graphic content to include the Title of the Project and the names and addresses of the following:
   1. Owner
   2. Architect
   3. Prime contractor
   4. Major subcontractors.

C. The copy, general arrangement, colors and location of the sign shall be approved by the Architect.

D. Sign materials: New or used wood or metal structure and framing and new exterior grade softwood plywood with medium density overlay for sign surface. Use standard large sizes to minimize joints.

E. Paint exposed surfaces of supports, framing and surface material with coat of primer and one coat of exterior paint as specified in Section 09900. Sign graphics shall be intermediate grade computer cut vinyl.

F. Remove sign, framing and supports at completion of project.

2.5 PARKING AND STAGING AREAS:

A. Available on site as directed by Architect. Do not use any other areas unless approved by Architect.

2.6 CONSTRUCTION AIDS:

A. Provide and maintain for the duration of the construction, temporary equipment and apparatus including

scaffolds, elevators and hoists, canopies, tarpaulins, barricades, warning signs, steps, ladders, platforms, ramps, chutes and other temporary construction aids and miscellaneous facilities as necessary for proper completion of the work; comply with pertinent safety regulations.

2.7 TEMPORARY HEAT:

A. Provide temporary heat where indicated and where necessary for the proper performance of the work, for curing or drying of work recently installed, and for protection of work in place from adverse effects of low temperatures.

2.8 DEWATERING AND ICE AND SNOW REMOVAL:

A. Maintain site, excavations and construction free of water, snow and ice as necessary for protection and execution of the work. Comply with dewatering requirements specified in Section 02200; Where feasible, utilize same facilities.

2.9 TEMPORARY FENCING:

A. Provide and maintain a temporary fence around construction area, with truck and pedestrian gates, as indicated and as required by project conditions.

2.10 TEMPORARY FIRE PROTECTION:

A. During construction period and until fire protection needs are fulfilled by permanent facilities, provide and maintain types and forms of temporary fire protection needed to protect facilities against fire losses. Store combustible materials in recognized fire-safe locations and containers.

2.11 PROTECTION OF EXISTING TREES AND VEGETATION

A. Provide temporary fencing, barricades or guards to protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line (outer perimeter of branches), excess foot or vehicular traffic, or parking of vehicles within drip line.

B. Provide protection for roots over 1-1/2" diameter cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

2.12 SECURITY:

A. Provide sufficient control to prevent illegal entry or damage during nights, holiday, or other periods when work is not being executed, and such other controls as required during working hours.

PART 3 EXECUTION

3.1 REMOVAL:

A. Maintain construction facilities and temporary controls as long as necessary for safe and proper completion of the work. Remove temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Architect.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. General Conditions
- B. Supplementary Conditions
- C. Divisions 1
- D. Product Options and Substitutions

1.2 PRODUCTS
- A. Products: Means new material, machinery, components, equipment, fixtures and system forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.
- B. The specifications contain provisions for products and substitutions other than those specifically identified. Select optional products in accordance with the requirements herein.

1.3 PRODUCT OPTIONS
- A. Products specified by reference standards, by performance standards or by descriptions: Provide any product meeting those standards or descriptions.
- B. Proprietary products specified by naming one or more manufacturers.
  1. Provide products of any one of the named manufacturers which meet the requirements of the specifications.
  2. Submit a request for substitution for products of any manufacturer not named, in accordance with paragraph 1.4 below.
- C. Document that optional products selected meet the requirements specified by making submittals in accordance with Section 01300.

1.4 SUBSTITUTIONS
- A. The materials, products, and equipment described in the specifications establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- B. Submit a request for substitutions for products of manufacturers not named, not less than seven days prior to date for receipt of bids.
- C. Document each request with complete data substantiating compliance of proposed substitution with the characteristics of performance, durability, appearance, and size of the specified product.
- D. Architect and/or Construction Manager will determine if proposed substitution is acceptable.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01700

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Demonstrations and Instructions
B. Testing and Adjusting
C. Warranties
D. Final Cleaning
E. Contract Closeout

1.2 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date final review Include instructions by manufacturer's representatives where installers are not familiar with in the necessary procedures.
B. For equipment or systems requiring seasonal operation, perform demonstration for other than current season within six months or at beginning of new season, whichever comes first.
C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, emergency operations, noise or vibration adjustments, safety, economy/efficiency adjustments and shut-down of each item at agreed-upon time at designated location.
D. Review with Owner's personnel, maintenance and operations in relation to applicable warranties, agreements to maintain, bonds or any other commitments.
E. Review with Owner's personnel, maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification systems, control sequences, hazards, cleaning requirements and any similar documents or procedures.
F. Operation and Maintenance Manuals: Assemble two sets of operation and maintenance manuals. Include emergency instructions, spare parts listing, warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data and any similar applicable information.
    1. Bind each manual of each set in a heavy-duty (2" minimum), 3-ring vinyl covered binder and include pocket folders for folded sheet information.
    2. Mark identification on both front and spine of each binder.
    3. Instruction and Maintenance Manuals are required for, but not necessarily limited to the following:
        a. Plumbing System
        b. HVAC System
        c. Electrical System
G. Deliver tools, spare parts, extra stocks of materials and similar items to Owner.
H. Make final change-over of locks and transmit keys to Owner. Advise Owner or Owner's personnel of change-over in security provisions.

1.3 TESTING AND ADJUSTING

A. Test equipment and systems at full operating conditions and pressures for normal conditions of use. Make adjustments to ensure smooth and unhindered operation.
B. Replace products and equipment as necessary to comply with Contract Documents and all applicable codes and regulations.

1.4 WARRANTIES

A. Contractor shall warrant that the work for this building project shall be free from defects of labor and materials for a period of one (1) year from the date of final acceptance of same, except for when longer periods are specified elsewhere.

B. Other Warranties:
    1. Special Warranty shall be defined as a written warranty required by or incorporated into the requirements of the specifications to either extend the time limits provided by standard warranties or to provide greater rights or protection to the Owner.
    2. Product Warranties shall be defined as pre-printed, written warranties provided by individual manufacturers for particular products and specifically endorsed by the manufacturer to the Owner.

C. Related Damages and Losses: When correcting warranted work, remove and replace any other work which has been damaged as a result of failure of the warranted work or that must be removed and replaced to provide access to the warranted work for correction.
D. Reinstatement of Warranty: When work covered by warranty has failed and been corrected, reinstate the warranty by written endorsement equal to the original warranty with equitable adjustment for depreciation.
E. Replacement Cost: The Contractor is responsible for the full cost of replacing or re-building defective work and for related damages.
F. Prior to date of Substantial Completion, submit all warranties, special warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents required by the Contract Documents.

1.5 FINAL CLEANING

A. Execute final cleaning prior to substantial completion inspection.
   1. Special cleaning for specific units of work is specified in individual specification sections.
   2. General cleaning during progress of work is specified in General Conditions and in other sections of Division 1.
   3. Provide final cleaning of the work, at time specified, by cleaning each surface or unit of work to normal “clean” condition. Comply with manufacturer’s instructions and recommendations for cleaning operations.
   4. Clean project in general as indicated below:
B. Remove labels which are not intended to be permanent.
C. Clean transparent materials, including mirrors and window/door glass to a polished condition.
D. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust and stains.
E. Do not disturb natural weathering of exterior surfaces.
F. Wipe surfaces of mechanical and electrical equipment clean. Remove excess lubricant and other foreign substances.
G. Remove dirt and debris from limited-access spaces including roofs, gutters, downspouts, drainage systems, plenums, shafts, trenches, equipment, vaults, manholes, attics and similar spaces.
H. Clean concrete floors in non-occupied spaces broom clean.
I. Vacuum clean carpeted and other similar soft surfaces.
J. Clean plumbing fixtures to a sanitary condition free of stains including those from water exposure.
K. Clean food service equipment to a sanitary condition ready and acceptable for intended food service.
L. Clean light fixtures and lamps so as to function with full efficiency. Replace lamps used for temporary lighting.
M. Replace filters of operating equipment.
N. Clean project site (yard and grounds), including landscape development areas, of litter and any foreign substances.
   1. Sweep paved areas to a broom clean condition.
   2. Remove stains, petro-chemical spills and any other foreign deposits.
O. Comply with all safety standards and any governing regulations for cleaning operations.
   1. Do not burn waste materials at site or bury debris or excess material on Owner’s property.
   2. Do not discharge volatile or other harmful or dangerous materials into drainage systems.
   3. Remove waste materials from site and dispose of in a lawful manner.

1.6 CONTRACT CLOSEOUT

A. Prerequisites to Substantial Completion:
   1. Perform work as described in paragraphs above.

2. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including occupancy permits, operating certificates and similar releases.
3. Complete final cleanup, operation and maintenance data and warranty requirements as indicated above.
4. Prepare an Application for Payment to coincide with the date of Substantial Completion. Show 100% completion for the portion of the Work claimed as substantially complete.
    a. If 100% completion cannot be shown, include a list of incomplete items accompanied by a valuation of incomplete construction, an explanation of the reason that work is not complete and a schedule indicating when incomplete items will be completed.
5. Advise Owner of pending insurance change-over requirements.

B. Substantial Completion: Upon receipt by Contractor of sub-contractor's request for inspection, Contractor shall proceed with inspection or advise sub-contractor of prerequisite not fulfilled. After initial inspection, Contractor shall:
1. Prepare a Certificate of Substantial Completion accompanied by an inspection report in the form of a "punch list" of items to be completed or corrected;
2. Or advise sub-contractor of work which must be performed or completed prior to issuance of certificate; and repeat inspection when requested and assured that work has been completed.

C. Final Acceptance: Prior to requesting Architect's final inspection for certification of final acceptance and final payment as required by the General Conditions, complete the following and list known exceptions in request:
1. Submit final payment request accounting for additional (final) changes to Contract Sum with final releases and supporting documentation not previously submitted and accepted.
    a. Include certificates of insurance for products and completed operations where required.
2. Submit copy of Architect's final punch list of itemized work to be completed or corrected stating that each item has been completed or otherwise resolved for acceptance.
3. Submit consent of surety.
4. Submit a final statement of settlement of liquidated damages.

D. Final Inspection: Upon receipt of Contractor's notice that all work has been completed, including punch list items resulting from earlier inspections and excepting incomplete items delayed because of acceptable circumstances, Architect will re-inspect work.

PART 2 PRODUCTS
Not Applicable

PART 3 EXECUTION
Not Applicable

END OF SECTION

SECTION 01740

WARRANTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section specifies general administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
   1. Specific requirements for warranties for the work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions 2 through 16.
   2. Certifications and the commitments and agreements for the continuing services to the Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor or the warranty on the work that incorporates the products, nor does it relieve the suppliers, manufacturers and sub-contractors required to countersign special warranties with the Construction Manager

C. Except as other wise specified all work shall be guaranteed by the Contractor and/or Subcontractor against defects resulting form use of inferior materials, equipment or workmanship for one (1) year from date of final completion of the Contract.

D. In case of work performed by subcontractors and where guarantees are required under the various technical Divisions of the Specifications, warranties addressed to and in favor of the Owner shall be secured from said subcontractors and delivered to the Owner upon completions of the work The delivery of said guarantees shall not relieve the Contractor from any obligation assumed under any other provision of the Contract.

E. After Final Payment: Neither the final certificate for payment nor any provisions in the Contract Documents shall relieve the Contractor or subcontractor of responsibility for faulty materials or workmanship, and unless otherwise specified, he/she shall remedy any defects due thereto and pay for any damage to other work resulting there from which shall appear within a period of one (1) year from date of final acceptance.

1.2 WARRANTY REQUIREMENTS

A. Related Damages and Loses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor and/or subcontractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
   1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

E. The Owner reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

F. In case the Contractor and/or Subcontractor fails to do the work ordered the Owner may have the work done an charge the cost thereof against monies due or to become due the Contractor and/or Subcontractor. If no such monies are available the Contractor and/or Subcontractor and his/her sureties shall pay the Owner the cost of such work.

G. If within a guaranty and warranty period defects develop due to faults in materials or workmanship the Contractor and/or Subcontractor shall, within seven (7) days after notification to the Contractor and/or Subcontractor by the Owner and without additional expense to the Owner:
   1. Replace in satisfactory condition in every particular all of such guaranteed work, correct all defects there in and;

2. Make good all damage to the building or site, or equipment or contents thereof which, in the opinion of the Owner's Construction Manager and the Owner, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract and;
3. Make good any work or material, or the equipment and contents of said building or site disturbed, in fulfilling any such guarantee.

1.3 SUBMITTALS

A. Form of Submittal: At Final Completion compile two copies of each required warranty properly executed by the Contractor, Subcontractor, supplier, or manufacturer. The Construction Manager shall organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

B. Bind warranties in heavy-duty, commercial quality, durable 3-ring vinyl covered loose leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" x 11" paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name address and telephone number of the installer.
2. Identify each binder on the front and the spine with typed or printed title "WARRANTIES", the Project title or name, and the name of the Construction Manager.
3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 PRODUCTS (not applicable)

PART 3 EXECUTION

A. Guarantee shall be in the format provided by the Owner.

END OF SECTION

DIVISION 2 SITEWORK

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Demolition of designated structures; disconnecting utilities; removing designated building equipment and fixtures; removing designated partitions and components.

1.2 SUBMITTALS

Not required

1.3 REGULATORY REQUIREMENTS

A. Conform to latest edition of International Building Code for demolition of structure, safety of adjacent structures, dust control, service utilities and discovered hazards.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain temporary barriers and security devices.
B. Notify adjacent owners of work which may affect their property, potential noise, utility outage, or disruption. Coordinate with owner.
C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.
D. Protect existing landscaping materials and structures which are not to be demolished.
E. Erect and maintain weatherproof closures for exterior openings.
F. Erect and maintain temporary partitions to prevent spread of dust, odors and noise and to permit continued Owner occupancy.
G. Protect existing items which are not indicated to be removed.

3.2 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures and building areas.
B. Conduct operations with minimum interference to public or private accesses.
C. Maintain egress and access at all times. Do not close or obstruct roadways or sidewalks without permits.
D. Cease operations immediately if adjacent structures appear to be in danger. Notify Architect.

3.3 BUILDING DEMOLITION

A. Disconnect, cap and remove existing utilities.
B. Demolish structures and components indicated in an orderly and careful manner.
C. Remove existing foundations to minimum 24" below finish grade.
D. Remove concrete slabs on grade.
E. Backfill all areas excavated caused as a result of demolition.
F. Rough grade and compact areas affected by demolition to maintain site grades and contours.

3.4 SELECTIVE DEMOLITION

A. Demolish and remove components in an orderly and careful manner, in sequence as indicated on Drawings.
B. Protect existing supporting structural members.

3.5 CLEAN UP

A. Remove demolished materials from site as work progresses. Dispose of in safe and legal manner.
B. Leave areas of work in clean condition.

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site preparation, complete, including clearing and grubbing, removal of trees and other vegetation, topsoil stripping and stockpiling and removal of known above and below-grade appurtenances as required for new construction.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:

A. Protection of existing trees; Section 01500.
B. Earthwork; Section 02200.

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site preparation operations to ensure minimum interference with roads, streets and other adjacent occupied and used facilities. Do not close or obstruct roads and or streets without permission from authorities having jurisdiction.

B. Protection of existing improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place. Protect improvements on adjoining properties and on the Owner's property. restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SITE CLEARING

A. General:

1. Remove trees, shrubs, grass and other vegetation, improvements or obstructions interfering with new construction. Remove such items elsewhere on the site or premises as specifically indicated. removal includes digging out stumps and roots.
2. Carefully and cleanly cut roots and branches of trees indicated to be left standing where such roots and branches obstruct new construction. Use sharp pruning instruments for cutting; do not break or chop. Coordinate with requirements specified in Section 01500 for tree and vegetation protection.
3. Identify and protect all utilities from damage.
4. Verify that survey benchmark and intended elevations for the work are as indicated.

B. Topsoil:

1. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2" in diameter, and without weeds, roots and other objectionable material.
2. Strip topsoil to whichever depths encountered in a manner to prevent intermingling with the underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping. Where trees are indicated to be left standing, cease topsoil stripping at sufficient distance to prevent damage to the main root system.
3. Stockpile topsoil in storage piles in areas shown or where otherwise directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

C. Clearing and Grubbing:

1. Clear the site of trees, shrubs and other vegetation except for that indicated to be left standing. Completely remove stumps, roots and other debris protruding through the ground surface. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
2. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated. Place fill material in horizontal layers not to exceed 6" loose depth and thoroughly compact to a density equal to adjacent original ground.

D. Removal of improvements: Remove above-grade and below-grade improvements necessary to permit construction and other work as indicated. Abandonment or removal of certain underground pipe or conduits

may be shown on mechanical or electrical drawings and is included under work of those sections. Removal of abandoned underground piping and conduit interfering with construction is included under this section.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted on the Owner's property.

B. Remove waste materials, unsuitable topsoil and excess topsoil from the Owner's property and dispose of off site in a legal manner.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site grading, removal of topsoil and subsoil, building excavating and trenching, backfilling, and compacting.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Site Preparations; Section 02100.
B. Controlled Fill; Section 02150.
C. Asphaltic Concrete Paving: Section 02510.
D. Portland Cement Concrete Paving; Section 02520.

1.3 SAMPLES

A. If imported fill is used for earthwork, submit samples in accordance with Section 01300.
B. Submit 10 lb (4.5 kg) sample of each type of fill to testing laboratory, in air tight containers.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Topsoil: Reusable excavated friable loam; free of subsoil, roots, grass, excessive amount of weeds, large stone, and foreign matter.
B. Subsoil: Excavated material, graded free of lumps larger than 6 inches, rocks larger than 3 inches and debris.

2.2 FILL MATERIALS

A. Type A - (base rock): Crushed stone, or crushed or uncrushed gravel, with 0% retained in 1-1/2 sieve, 10-50% retained in 3/4 sieve, 50-75% passing #4 sieve, 70-90 retained in #40 sieve, and 90-97 retained in #200 sieve.
B. Type B - (sub-base): Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand, as acceptable to the Architect.
C. Type C - (drainage fill): Washed, uniformly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2 sieve an not more than 5% passing a No. 4 sieve.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
C. Identify and flag known utility locations. Notify utility company to remove and relocate utilities.
D. Maintain and protect existing utilities to remain.
E. Verify foundation or basement walls are braced to support surcharge forces imposed by backfilling operations.

3.2 PROTECTION OF ADJACENT WORK

A. Protect utilities, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
B. Grade excavation top perimeter to prevent surface water run-off into excavation or to adjacent structures.

3.3 TOPSOIL EXCAVATING

A. Do not excavate wet topsoil.
B. Excavate topsoil and stockpile in area designated on site.

3.4 SUBSOIL EXCAVATING

A. Do not remove wet subsoil.
B. Excavate subsoil required for building foundations, construction operations, and other Work.
C. Slope banks to angle of repose or less, until shored.
D. Excavation shall not interfere with 45 degree bearing splay of any foundation.
E. Correct unauthorized excavation at no extra cost to Owner.
F. Fill over-excavated areas under structure bearing surfaces in accordance with direction by Architect and/or Engineer.
G. Stockpile subsoil in area designated on site, remove subsoil not being reused from site.

3.5 TRENCHING

A. Excavate for storm sewer, sanitary sewer, water, gas and electrical piping and conduits.
B. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.
C. Hand trim excavation and leave free of loose matter.
D. Support pipe and conduit during placement and compaction of bedding fill.
E. Backfill trenches to required contours and elevations.
F. Place and compact fill materials as for Backfilling.

3.6 BACKFILLING

A. Backfill areas to contours and elevations. Use unfrozen and unsaturated materials.
B. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy sub-grade surfaces.
C. Place and compact fill materials in continuous layers not exceeding 8 inches loose depth.
D. Place and compact soil material in continuous layers not exceeding 8 inches loose depth.
E. Employ a placement method so not to disturb or damage foundations, foundation perimeter drainage or utilities in trenches.
F. Maintain optimum moisture content of backfill materials to attain required compaction density.
G. Backfill against supported foundation walls. Backfill simultaneously on each side of unsupported foundation walls.
H. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.

3.7 PLACING TOPSOIL

A. Place topsoil in areas where seeding is scheduled.
B. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of sub-grade.
C. Remove large stone, roots, grass, weeds, debris, and foreign material while spreading.
D. Lightly compact roll placed topsoil.
E. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.8 TESTS: As specified in Section 02150.

3.9 TOLERANCES

A. Top Surface of Exposed Sub grade: Plus or minus one inch.
B. Top of Topsoil: Plus or minus 1/2 inch.

3.10 SCHEDULE

A. Interior Slab-On-Grade: Type B fill compacted to 95 percent; with cover of Type A fill, 6 inches thick, compacted to 95 percent.
B. Exterior Side of Foundation Walls and Retaining Walls Over Granular Filter Material and Foundation Perimeter Drainage: Type B fill, to sub-grade elevation, each lift compacted to 90 percent.
C. Fill Under Landscaped Areas: Type B fill, to 12 inches below finish grade, compacted to 90 percent.
D. Fill Subbase Under Asphalt Paving: Type A fill, to 2-1/2 inches below finish paving elevation, compacted to 95 percent.

END OF SECTION

SECTION 02280

SOIL TREATMENT

PART 1 GENERAL

1.1 SCOPE:
- A. Provide soil treatment for termite control, complete.

1.2 SUBMITTALS: Comply with Section 01300.
- A. Product Data:
  - 1. Indicate each toxicant to be used, composition by percentage, dilution schedule, rate and volume calculations, intended application rate.
- B. Manufacturer's Instructions: Submit current EPA approved labels for each product used.
- C. Material Safety Data Sheets: Submit current EPA approved labels and MSDS for each product used.

1.3 QUALITY ASSURANCE
- A. Applicator: Professional specializing in performing the work of this section licensed by the state where the project is located and with experience in termiticide application.
- B. Comply with requirements of State Plant Board, or other governing authority.

1.4 WARRANTY
- A. Provide 5 year warranty certifying that applied soil termiticide treatment will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during the warranty period, Contractor will re-treat the soil and repair or replace damage caused by termite infestation.

1.5 REGULATORY REQUIREMENTS
- A. Provide EPA registration numbers under Federal Insecticide, Fungicide and Rodenticide Act.
- B. Conform to applicable codes, EPA and state and local regulations.

1.6 DELIVERY, STORAGE AND HANDLING
- A. Deliver products to the jobsite in original, labeled and sealed containers.
- B. Do not store products on the jobsite.

1.7 PROJECT CONDITIONS:
- A. Do not apply soil treatment solution until excavating, filling and grading operations are completed. Do not apply soil treatment to frozen or excessively wet soils or during inclement weather.
- B. Comply with handling and application instructions of the soil toxicant manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURER
- A. FMC Corporation, Pest Control Specialties Operations, PO Box 8, Princeton, New Jersey 08543

2.2 MATERIALS
- A. Soil Treatment Solutions:
  - 1. Emulsible concentrate insecticide for dilution with water, synthetically died to permit visual identification of treated soil of a generic chemical composition approved for use by authorities having jurisdiction. At Contractor's option, one of the following or approved equal:
    - a) Dragnet FT: Termiticide containing permethrin at the rate of 3.2 lbs per gallon. EPA assigned "Signal Word" CAUTION.
    - b) Prevail FT: Termiticide containing cypermethrin at the rate of 2.0 lbs per gallon. EPA assigned "Signal Word" CAUTION.
    - c) Biflex TC: Termiticide containing bifenthrin at the rate of 2.0 lbs per gallon. EPA assigned "Signal Word" WARNING.
- B. Water:
  - 1. Clean and not detrimental to soil or insecticide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that soils to be treated are not frozen, are sufficiently dry to absorb toxicant and ready to receive treatment.
B. Verify that the area is well ventilated.
C. Verify that anticipated weather conditions will comply with label recommendations prior to application.

3.2 PREPARATION

A. Remove all non-essential wood and cellulose containing material from around foundation walls, crawl spaces and porches, etc.
B. Refer to manufacturer's instructions on package label.
C. Mix products with water to produce the emulsions on the jobsite.

3.3 APPLICATION

A. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake and level soil to be treated, except previously compacted areas under slabs and foundations.
B. Concentrations and Application Rates: Comply with label directions of termiticide, and with State Plant Board or other governing authority specifications and recommendations for the following areas:
    1. Under slab-on-grade, sidewalks, platforms, ramps, and paving within the border of roof line.
    2. Floor drains and traps.
    3. Below expansion joints, control joints, and to all electrical and plumbing conduits and pipes that penetrate the concrete slab.
    4. Along both sides of foundation walls, around perimeter of concrete footings, beams, and piers that extend below grade.
C. Allow not less than 12 hours for drying after application before beginning construction activities.
D. Post signs in the areas of application warning workers that soil termiticide treatment has been applied. Remove signs when areas are covered by other construction.
E. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION

SECTION 02520

PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Concrete sidewalks, curbs, gutters and parking areas.

1.2 SYSTEM DESCRIPTION
- A. Paving and Base: Designed for parking.

1.3 QUALITY ASSURANCE
- A. Perform work in accordance with ACI 301. and Section 03001.

PART 2 PRODUCTS

2.1 CONCRETE PARKING BUMPERS
- A. Concrete parking bumper blocks shall be 6'-0" long x 9" wide x 5" high units reinforced with (2)#4 bars. Secure each in position with (2) #4 rebar pins driven into asphalt surface.

2.2 MATERIALS
- A. Forms: Wood material, profiled to suit conditions.
- B. Joint Filler: Asphalt impregnated wood fiberboard.
- C. Reinforcing Materials
  1. Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars, unfinished.
  2. Welded Steel Wire Fabric: Plain type, in flat sheets, unfinished.
  3. Dowels: Plain steel, unfinished.
- D. Concrete Materials
  1. Cement: ASTM C150 Normal Type, Portland type, gray color.
  2. Fine and Coarse Aggregates: ASTM C33.
  3. Water: Clean and not detrimental to concrete.
  4. Admixtures: ASTM C260.
  5. Curing Compound: As specified in Section 03001.
  6. Liquid Surface Sealer: As specified in Section 03001.

2.2 CONCRETE MIX
- A. Comply with requirements of Section 03001 for concrete mix design, sampling testing and quality control and as specified below.
- B. Design the mix to produce standard-weight concrete consisting of portland cement, aggregate, air-entraining admixture and water to produce the following properties:
  1. Compressive Strength at 28 days: 4000 psi min.
  2. Slump range: 4" plus or minus 1-1/2".
  3. Air entrainment: 5 to 7 percent
  4. Flexural strength: ASTM C 78, 550 psi minimum at 28 days.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION
- A. Verify gradients and elevations of base.
- B. Verify compacted subgrade, granular base or stabilized soil is ready to support paving and imposed loads.
- C. Moisten substrate to minimize absorption of water from fresh concrete.

3.2 FORMING
- A. Place and secure forms to correct location, dimension, and profile.
- B. Place joint filler in joints, vertical in position, in straight lines. Secure to formwork.
- C. Place expansion joints at 20 foot intervals. Align joints.
- D. Place joint filler between paving components and other appurtenances.

3.3 REINFORCEMENT

A. Place reinforcement at mid-height of slabs-on-grade.
B. Interrupt reinforcement at expansion joints. Place dowels with one end lubricated, the other to bond to concrete.
C. Place dowels and reinforcement to achieve pavement and curb alignment.

3.4 PLACING CONCRETE

A. Place concrete in accordance with ACI 301. and Section 03001.
B. Do not disturb reinforcement or formwork components during concrete placement.
C. Place concrete continuously between predetermined joints.

3.5 FINISHING

A. Sidewalk and walking Surfaces: Light broom, radiused and trowel joint edges.
B. Curbs and Gutters: Light broom.
C. Apply curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.
D. Where concrete curb ramps adjoin vehicle traffic ways, provide detectable warning surface for ramp complying with ADAAG.

END OF SECTION

SECTION 02740

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Conditions
B. Supplementary Conditions
C. Division 1
D. Asphaltic concrete paving

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with Department of Planning, Engineering & Permits City of Joplin, Missouri's "ENGINEERING DESIGN GUIDELINES FOR SUBDIVISIONS OR COMMERCIAL DEVELOPMENTS."

1.3 ENVIROMENTAL REQUIREMENTS

A. Do not place asphalt when ambient or base surface temperature is less than 40 degrees F or base surface is wet or frozen.

PART 2 PRODUCTS

2.1 PAVEMENT MATERIALS

A. Asphalt Cement: In accordance with Department of Planning, Engineering & Permits City of Joplin, Missouri standards.

2.2 ASPHALT PAVEMENT MIX

A. Use dry material to avoid foaming. Mix uniformly.
B. Base Course: Department of Planning, Engineering & Permits City of Joplin, Missouri.
C. Wearing Course: Department of Planning, Engineering & Permits City of Joplin, Missouri.

2.3 STRIPING MATERIALS

A. Striping Paint specifically designed & listed for striping of parking lots.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify gradients and elevations of base.
B. Verify compacted or modified sub grade is dry and ready to support paving and imposed loads.

3.2 PLACING ASPHALTIC PAVEMENT

A. Apply asphalt primer in accordance with Department of Planning, Engineering & Permits City of Joplin, Missouri standards.
B. Place bituminous mixtures with a spreading and finishing machine, to the typical cross-section shown.
   1. Place mixture in strips not less than 10 feet wide.
   2. Place mixture around obstacles and in small areas by hand tools.
C. Compacted Thickness:
   1. Base Course:
      a) Untreated sub grade: compacted 6" sand & clay in light parking & truck traffic areas.
   2. Surface Course: 2" asphalt.
D. Joints:
   1. Coat the contact surfaces of curbs, gutters, manholes and similar structures, with asphalt prior to placing the asphalt mixture against them.
   2. Make construction joints between successive day's work by use of wooden headers or by cutting back previously laid material full depth to expose a fresh surface. Coat contact surface of previously placed material with asphalt.

3.3 COMPACTION

A. General: Begin rolling when mixture will bear roller weight without excessive displacement. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, hot material.
D. Second Rolling: Follow breakdown rolling as soon as possible while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

3.4 PATCH AND REPAIR

A. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cutout such areas and fill with fresh, hot asphalt concrete. Compact by rolling to a maximum surface density and smoothness.

3.5 PROTECTION

A. Protection: After final rolling, do not permit Vehicular traffic on pavement until it has cooled and hardened.
B. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 FIELD QUALITY CONTROL

A. General: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect.
B. Tolerances;
    1. Flatness: Maximum variation of 1/4" measured with 10' straight edge.
    2. Compacted Scheduled Thickness: Within 1/4" of design thickness.

3.7 APPLICATION OF STRIPING

A. Minimum of 2" wide stripes located as indicated on plans.
B. Paint Handicapped symbol as indicated on plans.

END OF SECTION

SECTION 02920

SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. General Conditions
- B. Supplementary Conditions
- C. Division 1
- D. Preparation of soil, placement of seed, and fertilizer

1.2 SUBMITTALS
- A. Seed vendors certified statement for grass seed mixture, stating botanical and common name, percentages by weight of purity, germination, and weed seed.

PART 2 PRODUCTS

2.1 GRASS MATERIALS
- A Seed Mixture: Fresh, clean new-crop seed complying with Official Seed Analysts of North America requirements for purity and germination.
  - 1. K-31 Fescue
- B Fertilizer: Nitrogen 1lb per 1000 sq. ft, phosphoric acid, 4 percent, potassium, 2 percent.
- C Anti-erosion Mulch: Clean, seed free hay or threshed straw.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION
- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Apply fertilizer in accordance with manufacturer's instructions.

3.2 SEEDING
- A. Apply seed with spreader or seeding machine at a rate of 10 lb per 1000 sq ft evenly in two directions at right angles to each other.
- B. Rake seed lightly into top 1/8 inch of soil, and roll lightly
- C. Immediately following seeding, apply agricultural mulch or threshed straw to seeded areas.
- D. Apply water with a fine spray immediately after each area has been mulched.

END OF SECTION

SECTION 03001

CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formwork, Reinforcement, Accessories, Cast-in-place concrete, Finishing and curing.

1.2 SUBMITTALS: Comply with Section 01300

A. Shop Drawings: Submit to the Architect for review prior to installation, shop drawings of all reinforcing steel, including bar cutting lists, construction of forms including jointing, reveals, location and pattern of form tie placement and construction/expansion joint placement schedule with details.

B. Prior to placement of concrete, submit concrete mix designs proposed by the concrete supplier, for class of concrete, including recent test results substantiating the quality of concrete produced by each mix.

C. Weekly reports of all compression, slump and air content tests from the testing laboratory.

D. Provide a set digital pictures on a CD for the owners record of all concrete reinforcement, anchor bolts, chases, sleeves, insulation, and step footings/walls, after inspection by the building inspector having jurisdiction over the project and before placement of concrete.

1. Supply pictures of the type and minimum quality listed below.
   a. JPEG image, 5 mega pixel or better set to the largest format possible.
   b. Image must clearly show all items that will be hidden from view when project is completed. Pictures taken with a telephone camera will not be accepted.
   c. Pictures must be original pictures unedited, cropped or altered in any way.
2. Supply a legend for the pictures to clarify the date, location, and direction in which the picture was taken.
3. Submittal of these pictures to be part of project completion and are required before final payment will be processed.

1.3 QUALITY ASSURANCE

A. Reference Standards and Specifications: Comply with the provisions of the following specifications and standards, except as otherwise noted or specified, or as directed by the Architect during unusual climatic conditions.

1. ACI 301, "Specifications for Structural Concrete for Buildings."
2. ACI 318, "Building Code Requirements for Reinforced Concrete."
3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

1.4 TESTS

A. Testing of concrete cylinders to determine compressive strength of concrete delivered to the job site, shall be performed by an independent testing laboratory approved by the Architect. Tests shall be paid for by the Contractor.

B. Testing requirements are specified in FIELD SAMPLING AND TESTING paragraph in this section.

PART 2 PRODUCTS

2.1 FORM MATERIALS AND ACCESSORIES

A. For Exposed Finished Concrete: Plywood, metal, or other acceptable panel-type material, to provide continuous, straight, smooth, exposed surfaces.

B. For Unexposed Finish Concrete: Use plywood, lumber, metal or other acceptable material. If lumber is used, it must be dressed on at least 2 edges and 2 sides for a tight fit.

C. Form Coatings: Commercial formulation form coating compound that will not bond with, stain, nor adversely affect concrete surfaces, will not impair subsequent treatments or finishes requiring bond or adhesion, nor impede wetting of concrete surfaces by water or curing compound.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615(S1), deformed billet steel bars of grades as indicated on the structural drawings, free from loose rust, scale and other coatings that may reduce bond.
B. Welded Steel Wire Fabric: ASTM A185, welded wire fabric, of sizes and types as indicated on the drawings.
C. Accessories: Include spacers, chairs, ties and other devices necessary for properly spacing and fastening reinforcing in place. Use plastic protected reinforcing bar supports conforming with CRSI Class 1 specification for exposed finish concrete. Support reinforcing steel in footings with concrete brick or plastic protected reinforcing bar supports.
D. Tie Wires: Soft annealed iron wire not smaller than 18 gage.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Normal Type I.
B. Fine Aggregates: Clean, sharp, natural or manufactured sand, free from loam, clay, lumps or other deleterious substances.
C. Course Aggregates: Clean, uncoated, processed, locally available aggregate, containing no clay, mud, loam or foreign matter; maximum size of 1-1/2".
D. Mixing Water: Clean, free from oil, acid, salt, injurious amounts of vegetable matter, alkalis and other impurities; potable.
E. Air Entrainment Admixture: ASTM C260, 5% - 7%.
F. Other Admixtures: Do not use other admixtures unless accepted by Architect.

2.4 MISCELLANEOUS MATERIALS

A. Connectors: Provide all metal connectors required for placement in cast-in-place concrete, for the attachment of structural and non-structural members.
B. Expansion Joint Filler: ASTM D 1751, non-extruding pre-moulded material, 1/2" thick, unless otherwise noted, composed of fiberboard impregnated with asphalt, except use ASTM D 1752, Type II, resin-bound cork for walks and other exposed areas.
C. Curing Compound: ASTM C 309; Sonneborn "Kure-N-Seal", Euclid "Rez-Seal" or L & M "Dress & Seal 18".
D. Vapor Barrier: Polyethylene film, .006" thick (minimum .02856 lbs. per sq. ft. and 57.1 lbs. plus or minus 3% per 20' x 100' roll); Visqueen or approved equal.
E. Concrete Sealer: Sonneborn "Son-No-Mar", L & M "Super Seal 35" or Euclid "Eucopoxy I".
F. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
    1. Metallic: Master Builders "Embedco 636", Sonneborn "Ferrolith GDS", Euclid "Hi-Mod Grout" or L & M "Ferrogrout".
    2. Non-Metallic: Master Builders "Set Grout", Sonneborn "Sonogrout", Euclid "Euco-NS" or L & M "Crystex".
G. Bonding Agent: Polyvinyl acetate, rewettable type; Sonneborn "Sonocrete", Euclid "Eucoweld" or L & M "Everbond".

2.5 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C94, Alternative 3.
B. Strength: Concrete minimum ultimate strength at 28 days as noted on structural drawings and as specified.
C. Mix Design:
    1. Prepare design mixes for each type of concrete, in accordance with ACI 301 and ACI 318, except as otherwise specified.
    2. Proportion design mixes by weight for class of concrete required, complying with ACI 211, except as otherwise specified.
D. Provide test results from the concrete supplier for proposed design mix, to establish the following:
    1. Gross weight and yield per cu. yd. of trial mixtures.
    2. Measured slump.
    3. Measured air content.
    4. Compressive strength developed at 7 days and at 28 days, from not less than 3 test cylinders cast for each 7-day and 28-day test, and for each design mix.
E. Submit written reports to the Architect for design mix at least 15 calendar days prior to the start of work.
F. Use air-entrained admixture in strict compliance with manufacturer's directions.

PART 3 EXECUTION

3.1 FORMWORK ERECTION

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads and static and dynamic loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Construct forms in accordance with ACI 347, to sizes, shapes, lines and dimensions indicated, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, molding, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in work. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

C. Fabricate forms for easy removal without hammering or prying against the concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous location.

E. Chamfer exposed corners and edges 3/4" unless otherwise indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

G. Preparation of Form Surfaces: Coat the contact surfaces of forms with a form-coating compound where applicable before reinforcement is placed.

H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such ties. Accurately place and securely support items built into form.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms after concrete placement, if required, to eliminate mortar leaks.

3.2 REINFORCEMENT PLACEMENT

A. Where reinforcing is not specified, provide minimum of #4 bars at 12"oc each way for first 12" of concrete thickness and same again for each additional 8" of concrete thickness, or, as directed by Architect.

B. Comply with the Concrete Reinforcing Steel Institute (CRSI) "Recommended Practice for Placing Reinforcing Bars", and as herein specified.

C. Ensure reinforcing is clean, free of loose scale, dirt, or other materials or coatings which reduce or destroy bond with concrete.

D. Accurately position, support and secure reinforcement against displacement. Locate and support reinforcing by chairs, spacers and hangers as required. Set wire ties so ends are pointed into concrete.

E. In all cases, provide minimum concrete protection over reinforcement at least equal to the bar diameter. Where concrete is to be adjacent to earth, provide minimum protection of 1-1/2" and where concrete is to bear on earth provide minimum 3" clearance.

F. Do not place bars more than 2" beyond the last leg of continuous support. Do not use supports to hold runways for conveying equipment. Laps for reinforcing bars shall be 40 bar diameters or 24", whichever is greater.

G. Install welded wire fabric reinforcement in as long lengths as practicable, lapping pieces at least one mesh plus 2" but in no case less than 8". Lace splices with wire. Stagger end laps to avoid continuous laps in either direction. Lift mesh to middle third of slab by use of hooks.

3.3 JOINTS AND INSERTS

A. Construction Joints: Provide control and expansion joints. Locate and install joints, which are not shown on the drawings, so as not to impair the strength and appearance of the structure. Submit joint schedule to the Architect.

B. Inserts: Set and build into the work, anchorage devices and other embedded items required for other work that is attached to, or supported by, concrete. Properly locate embedded items in cooperation with other trades and secure in position before concrete is poured. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

3.4 CONCRETE PLACEMENT: Comply with ACI 304, and as herein specified.

A. Notify Architect 24 hours before placing any concrete.

B. Pre-Placement Inspection: Before placing concrete, clean and inspect formwork, reinforcing steel and items to be embedded or cast-in. Notify other crafts in ample time to permit the installation of their work and cooperate with them in setting such work as required. Make sure termite control treatment has been applied before vapor barrier and concrete are installed. Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

C. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.

D. Install vapor barrier under interior slabs on grade. Apply directly over base rock. Lap joints minimum 6 inches and seal watertight. Lay vapor barrier just before reinforcement is placed and concrete is poured. Protect against punctures. Repair damaged vapor barrier with vapor barrier material, lap over damaged areas minimum 6 inches and seal watertight.

E. Conveying: Convey concrete from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials. Provide equipment for chuting, pumping and pneumatically conveying concrete of proper size and design as to insure a practically continuous flow of concrete at the point of delivery and without segregation of the materials. Keep open troughs and chutes clean and free from coatings of hardened concrete. Do not allow concrete to drop freely more than 5 feet. All equipment and methods used for conveying are subject to the approval of the Architect.

F. Depositing: Deposit concrete continuously or in layers of such thickness that no concrete will be placed on hardened concrete so as to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as directed by Architect. Deposit concrete near or in its final location to avoid segregation due to re-handling or flowing, and displacement of the reinforcement.

G. Cold Weather Placing: Comply with the requirements of ACI 306.

H. Hot Weather Placing: Comply with the requirements of ACI 305.

I. Place concrete continuously between predetermined expansion, control and construction joints. Do not break or interrupt successive pours such that cold joints occur.

J. Compaction: Consolidate concrete during placing operations by vibrating when necessary and otherwise so that concrete is thoroughly worked around reinforcement and other embedded items and into corners and so that honeycomb condition is eliminated.

K. Place floor slabs in saw cut pattern indicated and with control joints at 20 foot intervals maximum both directions.

L. Where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and epoxy in place or pack with non-shrink grout as directed by Architect.

M. Screed slabs-on-grade and base for toppings level. In rooms or areas with drains in floor, provide uniform 1% slope in floor surface to drains.

3.5 FIELD SAMPLING AND TESTING: The following samples and tests will be performed by an independent testing laboratory approved by the Architect. Refer to paragraph 1.4 TESTS, for responsibility of payment for tests.

A. Samples:

1. Field samples shall be made and cured in accordance with ASTM C 31, for each concrete strength, at the rate of 4 test cylinders and one slump test for each 50 cubic yards of concrete from each day's pour.
2. Test cylinders as follows: one at 7 days, two at 28 days, and reserve the remaining for testing after a longer period as required by the architect, if the 28 day tests do not meet the required strength. In accordance with ASTM c 173 Volumetric Method, or ASTM C 231 pressure Method, make air content check for each set of test cylinders.
3. The taking of samples from small pours of 10 cubic yards or less may be omitted with permission of the Architect.
4. When early form removal is requested, field cure cylinders tested at 7 or less days to determine sufficient strength.

B. Testing:

1. Where strength of any group of 3 cylinders or of any individual cylinder fall below minimum compressive strength specified, the Architect shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by Architect from location in structure

represented by test specimen of specimens which failed.

2. Specimens shall be secured, prepared, and tested in accordance with ASTM X 42, within a period of 60 days after placing concrete.
3. Concrete shall be considered to meet the strength requirements of paragraph 4.8.4 of ACI 318.
4. Should laboratory analysis indicate that the proper concrete mix has not been used by the Contractor, all such concrete poured using the improper mix shall be subject to rejection.
5. The cost of cutting specimens from the structure, patching the resulting holes, and making the laboratory analysis shall be borne by the Contractor.
6. The holes from which the cored samples are taken shall be packed solid with no slump concrete proportioned in accordance with the ACI 211 "Recommended Practice for selecting Proportions of No-Slump Concrete". The patching concrete shall have the same design strength as the specified concrete.
7. If any of the specimens cut from the structure fail to meet the requirements outlined in paragraph 4.8.4 of ACI 318, the Architect shall have the right to require any and all defective concrete to be replaced, and all costs resulting therefrom shall be borne by the Contractor.

C. Contractor Sampling: In addition to the slump tests specified above, the contractor shall keep a cone (mold) and rod apparatus on the job site for random testing of batches. When concrete does not meet the specified slump requirements, and when directed by the Architect, immediately perform a slump test in accordance with ASTM C 143. Concrete not meeting the slump requirements shall be removed from the job site.

3.6 FINISH OF FORMED SURFACES: All formed concrete surfaces exposed to view and not otherwise specified to be treated, shall be provided with smooth rubbed finish.

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. Concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or ground off.

B. Smooth Form Finish: For formed concrete surfaces that are to be covered with a coating material applied directly to the concrete, such as waterproofing, damproofing, painting or other similar system. Cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish: For all concrete surfaces which are to be exposed to view, and are not indicated to be finished otherwise, provide a smooth rubbed finish by first applying Smooth Form Finish treatment not later than one day after form removal and then immediately afterward as follows: Moisten concrete surfaces and rub smooth with carborundum brick or other abrasive until uniform color and texture is produced. Do not apply cement grout other than that created by rubbing process.

3.7 SLAB FINISHES:

A. Exposed Plain Concrete Finish: Finish concrete by forcing aggregate away from surface and screeding at proper level. Float surface and lightly trowel. When concrete has set sufficiently to ring under trowel, give a second troweling to produce a smooth, dense surface free from trowel marks and sweeps, air bubbles or other imperfections of troweling.

B. Slabs To Receive Floor Covering: Finish as in A. above, trowel to remove trowel marks and to a smooth, even finish, except omit second troweling.

C. Non-Slip Broom Finish: Provide light broom finish in order to produce non-slip surface.

D. Concrete Sealer: Apply minimum two coats in accordance with manufacturer's instructions or as many coats as necessary to provide completely sealed surface with uniform glossy surface.

3.8 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover, by curing and sealing compound, and by combinations thereof, as specified.

1. Provide moisture curing by keeping concrete surface continuously wet by covering with water, by

water-fog spray, or by covering concrete surface with specified absorptive cover, thoroughly saturating over with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Provide moisture-cover curing by covering concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Provide curing and sealing compound on interior slabs to receive resilient flooring, or left exposed; and to exterior slabs, walks, and curbs, as follows:
   a) Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
   b) Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, waterproofing, flooring (glue-down carpets), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.

C. Curing Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs and other flat surfaces by application of appropriate curing compound. Final cure concrete surfaces by moisture-retaining cover, unless otherwise directed.

3.9 PROTECTION

A. No wheeling, working, or walking on finished surfaces will be allowed for 16 hours after the concrete is placed.
B. Provide plywood or other acceptable protective cover at all traffic areas throughout the job.
C. Protect exposed concrete floors, steps and walks from paint, dirt or mud and other debris, materials or equipment which may stain, marr or damage these surfaces.

3.10 REMOVAL OF FORMS: Do not remove forms until the concrete has attained 67% of 28 days strength or a minimum of 4 days. Use a method of form removal which will not cause overstressing of the concrete.

3.11 MISCELLANEOUS ITEMS: Fill in holes and openings left in concrete for the passage of work by other trades after their work is in place. Mix, place, and cure concrete to blend with in-place construction. Provide all other miscellaneous concrete filling required to complete work.

3.12 CONCRETE SURFACE REPAIRS: Repair and patch defective areas with cement mortar of the same type and class as the original concrete, immediately after removal of forms. cut out honeycomb, rock pockets, voids over 1/2" diameter, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface, before placing cement mortar in the same manner as adjacent concrete. Proprietary patching may be used when acceptable to the Architect.

A. Smooth, Exposed-To-View Surfaces: Blend cements so that, when dry, patching mortar will match color of surrounding concrete. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
B. Concealed Formed Surfaces: Repair defects that adversely affect the durability of the concrete. If defects cannot be repaired remove and replace the concrete.
C. Other repair methods may be used, subject to Architect's acceptance.

3.13 CLEAN-UP: Do not allow debris to accumulate. Clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work, and upon completion of the entire cast-in-place concrete work.

3.14 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
B. Remove formwork progressively and in accordance with code requirements.
C. Apply bonding agent base course in accordance with manufacturer's instructions.

3.15 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.
B. Uniformly spread, screed, and float concrete.
C. Steel trowel surfaces which will receive carpeting, resilient flooring or which will be left exposed.
D. Maintain surface flatness, with maximum variation of 1/8 inch 10 ft.
E. In areas with floor drains, maintain floor level at walls and slope surfaces uniformly to drains.

3.16 CURING

A. Apply sealer on floor surfaces in accordance with manufacturer's instructions.
B. Immediately after placement, protect concrete from premature drying.
C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.17 FORMED SURFACES

A. Provide concrete surfaces to be left exposed smooth rubbed finish.

3.18 DEFECTIVE CONCRETE

A. Modify or replace concrete not conforming to required lines, details and elevations or specifications as directed by Architect/Engineer.

END OF SECTION

SECTION 04200

UNIT MASONRY SYSTEM

PART 1 GENERAL

1.1 SCOPE: Provide unit masonry work, complete, including foam board insulation at exterior walls.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Furnishing of anchors attached or anchored to masonry: Sections 03301 and 05500.
- B. Furnishing of materials for bar reinforcement; Section 03001.
- C. Water Repellent Coating; Section 07180.
- D. Building Insulation; Section 07210
- E. Firestopping; Section 07270
- F. Joint Sealers; Section 07900.

1.3 QUALITY ASSURANCE
- A. Codes and Standards: Provide material and work complying with reference codes, regulations and standards.
- B. Manufacture: Obtain each type of unit from one manufacturer, cured by one process, and of uniform texture and color.

1.4 SUBMITTALS: Comply with Section 01300
- A. Certification: Submit certification that each type of unit complies with specified requirements.
- B. Manufacturer's Data: Submit manufacturer's technical data and installation instructions for insulation material.
- C. Shop Drawings: Submit expansion and control joint layout.

1.5 DELIVERY, STORAGE AND HANDLING
- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion and other causes.
- C. Store cementitious materials off ground, undercover and in dry location.
- D. Store aggregates where grading and other required characteristics can be maintained.
- E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.6 JOB CONDITIONS
- A. Protect masonry materials during storage and construction from wetting by rain, snow or ground water and from soilage or intermixture with earth or other materials. Do not use metal reinforcing or ties having loose rust or other coatings, including ice, which will reduce or destroy bond.
- B. During erection, cover top of wall with heavy waterproof sheeting at end of each day's work. cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns. Don not apply concentrated loads for at least 3 days after building masonry walls or columns.
- D. Prevent grout, mortar or soil materials from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with masonry. Protect sills, ledges and projections from droppings of mortar.
- E. Do not lay masonry when the temperature of outside air is below 40 deg. F, unless means are provided to heat and maintain temperature of masonry materials and protect completed work from freezing. Protection shall consist of heating and maintaining temperature of masonry materials to at least 40 deg. F, and maintaining an air temperature above 40 deg. F on both sides of masonry for at least 48 hrs.

PART 2 PRODUCTS

2.1 FACING BRICK

A. ASTM C 216, Type FBS, Grade SW, 3-5/8" x 2-1/4" x 7-5/8".

B. Submit brick proposed for use. Comply with Section 01300

1. Comply with reference standards and other specified requirements for each type of masonry unit required.
2. Provide special shapes where required for lintels, corners, bullnose, jambs, sash, control joints, headers, bonding, cap, cove and other special conditions where directed by Architect.
3. Color and texture for facing units shall be as selected by the Architect.

2.2 CONCRETE MASONRY UNITS

A. General:

1. Comply with reference standards and other specified requirements for each type of masonry unit required.
2. Provide special shapes where required for lintels, corners, bullnose, jambs, sash, control joints, headers, bonding, cap, cove and other special conditions. Provide solid cap blocks for tops of masonry walls exposed to weather which are not otherwise protected. Provide bullnose blocks for outside corners of walls where directed by Architect.
3. For units used to construct walls which will be exposed to weather, provide units manufactured with integral waterproofing.
4. Color and texture for facing units shall be as selected by the Architect.

B. Concrete Block: Provide units complying with characteristics specified below for grade, type, face size, exposed face and, weight classifications.

1. Grade N.
2. Size: Manufacturer's standard units with nominal face dimensions of 16" long X 8" high X thicknesses indicated.
3. Type I, moisture-controlled units; cure units to meet specified requirements, including average dry shrinkage of 0.02% when tested in compliance with ASTM C 426.
4. Exposed Faces: Color and texture as selected by Architect.
5. Hollow Load bearing Block: ASTM C 90; lightweight, except use normal weight block for work below grade.
6. Hollow Non-Load bearing Block: ASTM C 129; lightweight, except use normal weight block for work below grade.

2.3 MORTAR AND GROUT MATERIALS

A. Provide mortar pigment additive materials as necessary in order to provide mortar materials in color as selected by Architect.

B. Portland Cement: ASTM C150 Type I, except Type III may be used for cold weather construction.

C. Hydrated Lime: ASTM C207, Type S.

D. Aggregate for Mortar: Sand, conforming to ASTM C144 or ASTM C404, Size No. 2.

E. Aggregate for Grout: ASTM C404, Size No. 8 or Size No. 89.

F. Water: Clean, drinkable.

G. Integral Waterproofing (provide at mortar at exterior veneer): Sonneborn "Hydrocide Powder", or approved equal.

2.4 MASONRY ACCESSORIES: Dur-O-Wal, AA Wire Products, National Ty-Wal, or approved equal. Provide hot-dip galvanized or other non-corroding finish as approved by Architect, for wall ties and reinforcing in exterior walls or other locations subject to corrosion.

A. Continuous Masonry Wire Reinforcing: Single wythe walls.

1. Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner and tee units. Fabricate from cold-drawn steel wire complying with ASTM A82, with deformed continuous side rods and plain cross rods, and a unit width of 1-1/2" to 2" less than thickness of wall or partition. Provide manufacturer's standard mill galvanized finish.
2. Use truss type fabricated with single pair of 9 gage side rods, and 9 gage continuous diagonal cross rods spaced not more than 16" o.c.

B. Wall Ties Anchors:

1. At Concrete: 1" wide X 1" deep X 3/4" throat, 24 gage mill galvanized dovetail anchor slot, and dovetail triangle with 1/4" wire tie and 12 gage mill galvanized dovetail.
2. At Cavity Walls: Double eye adjustable truss, with eye sections spaced 16" o.c., mill

galvanized; eye and pintle length as required by wall conditions.

2.5 INSULATION: Dow "Styrofoam SM" foam insulation board, 1-1/2" thick.

2.6 CONCEALED FLASHING: Nervastral HD or Wasco Type 20. Flexible sheet flashings formulated from virgin polyvinyl chloride with plasticizers and other modifiers to remain flexible and waterproof in concealed masonry applications, black in color; 20 mils thick.

2.7 SEALANT CONTROL JOINTS MATERIALS: Specified and furnished in Section 07900, installed under this section. Do not start sealant work until joints and joint preparation has been inspected and approved as acceptable for sealant work.

2.8 MORTAR AND GROUT MIXTURES

A. Mortar Mix: ASTM C 270, Type S.
B. Grout Mix: ASTM C 476.
C. Measure and batch materials either by volume or weight, such that required proportions can be accurately controlled and maintained. Measurement of sand exclusively by shovel will not be permitted. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of mortar. Mix ingredients for a minimum of 5 minutes in a mechanical mixer. Do not use mortar or grout which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2-1/2 hour period as required to restore workability. Do not add air-entraining agents or other admixtures to mortar or grout materials.

PART 3 EXECUTION

3.1 EXAMINATION: Examine the areas and conditions under which masonry is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Brick: Wet clay brick having ASTM C 67 absorption rates greater than .025 oz. per sq. in./minute.
B. CMU: Do not wet concrete masonry units.
C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.

3.3 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10', or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story of 20' maximum, nor 1/2" in 40' or more
B. Variation form Level: For lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 3/4" in 40' or more.
C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.
D. Variation in Cross-Section Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

3.4 INSTALLATION, GENERAL

A. Thickness: Build cavity walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.
B. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
C. Cut masonry units using motor-driven saws to provide clean, sharp un-chipped edges. Cut units as required to fit adjoining work neatly. Use full-size units without cutting wherever possible.
D. Keep cavities clean of mortar droppings and other materials during wall construction. Strike joints facing cavity flush.
E. Provide weep holes in exterior wythes of walls located immediately above ledges and flashing, spaced 24" o.c.
F. Insulation: Install insulation in strict accordance with manufacturer's recommendations.

3.5 LAYING MASONRY WALLS

A. Lay walls plumb and true to comply with specified tolerances, with courses level, accurately spaced and coordinated with other work.

B. Lay brick with completely filled bed, head and collar joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints. Lay in running bond with vertical joint in each course centered on units in course above and below, except where other coursing is indicated.

C. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with grout. In running bond, lay CMU with vertical joint in each course centered on units above and below. Where indicated, fill cells with concrete/grout.

D. Do not tooth corners.

E. Build-in items specified under this and other section of this specification. Fill in solidly with masonry around built-in items. Fill space between hollow metal frames and masonry solidly with mortar.

F. Locate vertical bar reinforcement of the size and in locations indicated. Solidly fill all cells containing reinforcement with grout in one lift not exceeding 8 feet. When grouting is stopped for one hour or more, form horizontal construction joints by stopping placement of grout 1-1/2" below top or uppermost units. Fill bond beams and block lintels completely with grout.

G. Build all masonry firewalls or separation walls up tightly to construction above in order to completely seal and to maintain fire rating from top to bottom and end to end. Provide firestopping at any voids or penetrations not properly sealed or as otherwise necessary to maintain specified fire rating of walls.

H. Provide vertical expansion joints in masonry walls offset 8" above all jambs at all openings and at intervals not to exceed 25'horizontally in all masonry walls.

I. Joints: Lay wall with 3/8" joints. Use as dry a mortar mix as practicable and compress joints as much as possible to produce a dense tight joint.

1. Concealed joints: Strike flush.
2. Exposed brick joints: Tool concave.
3. Exposed CMU joints: Tool concave.

3.6 ANCHORING MASONRY WORK

A. Anchor masonry to concrete with specified dovetail anchors and triangles spaced 16" o.c. vertically and horizontally.

B. At cavity wall place double eye truss in walls spaced 16" o.c. vertically.

3.7 HORIZONTAL JOINT REINFORCING

A. Reinforce walls with continuous horizontal reinforcing. Fully embed longitudinal side rods in mortar for their entire length. Lap reinforcement a minimum of 6" at ends of units. Do not bridge control joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcing as directed by the manufacture for special conditions. Space reinforcing 16" o.c. vertically

B. Reinforce masonry openings greater than 12" wide with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above the lintel and below the sill. Extend reinforcing a minimum of 2' beyond jambs of the opening bridging control joints where provided.

3.8 CONTROL AND EXPANSION JOINTS: Install vertical expansion control and isolation joints as indicated, and at maximum 30' o.c. at long wall runs, and at large openings in wall. Build-in related items as masonry work progresses. Refer to Section 07900 for sealants.

3.9 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of placement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

C. Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high

pressure water method.

D. Clean exposed CMU masonry by dry brushing at end of each day's work and after final pointing to remove mortar spots and drippings.

END OF SECTION

DIVISION 5 METALS

SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members, base plates, plates and grouting under base plates.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Section 03001: Placement of anchors for casting into concrete.
B. Section 04200: Placement of anchors for embedding into masonry.

1.3 SUBMITTALS: Comply with Section 01300.

A. Shop Drawings: Indicate sizes, spacing, and locations of structural members, openings, connections, cambers, loads, and welded connections.

1.4 QUALITY ASSURANCE: Comply with the provisions of the following codes and standards:

A. AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings".
B. AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation"
C. AWS D1.1 "Structural Welding Code".
D. All welding electrodes shall be A233 class E-70 series. Unless indicated otherwise: All welds on structural members shall be minimum 3/16" fillet welds and all welds for moment connections shall be minimum 1/4" fillet welds continuous all around.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of the work.
B. Deliver anchor bolts and anchorage devices, which are to be imbedded in cast-in-place concrete or masonry in ample time not to delay work.
C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms or other supports. Protect steel members and packaged materials from erosion and deterioration.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structural Steel Members: ASTM A992, Fy=50 ksi.
B. Structural Tubing:
    1. Cold formed: ASTM A500, Grade B, Fy=46ksi.
    2. Hot formed: ASTM A501, Fy=36ksi.
C. Pipe: Hot formed; ASTM A501, Fy=36ksi.
D. Bolts, Nuts, and Washers: ASTM A325, galvanized to ASTM A153 for galvanized members.
E. Anchor Bolts: ASTM A307.
F. Welding Materials: AWS D1.1; type required for materials being welded.
G. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days; manufactured by "Master Builders - Masterflow 713", "Euclid - euco N.S.", "L & M - Crystex, or "U. S. Grout - Five Star Grout".
H. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 FABRICATION AND ERECTION: Fabricate and assemble structural assemblies in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members as indicated.

A. Allow for erection loads. Provide temporary bracing to maintain framing in alignment until completion of erection and installation of permanent bridging and bracing.
B. Field weld components indicated on Drawings or shop drawings.
C. Do not field cut or alter structural members without approval of Architect/Engineer.
D. Fabricate work to shape and size with sharp lines and angles and smooth surfaces. Securely weld or bolt with bearing type connections, unless otherwise indicated. Dress welds smooth on exposed surfaces. Provide rabbets, lugs and brackets so that work can be assembled in a neat and substantial manner. Smooth exposed ends and edges of metal and form joints exposed to weather to exclude water.
E. Erect all work true to dimensions, line, level and plumb.
F. Weld in compliance with AWS Code for procedures, appearance and quality of welds, and methods used in correcting work.
G. See that anchor bolts in concrete are properly set to template.
H. Punch structural steel and/or furnish all clips required to accommodate work of other trades, where supported on or secured to structural steel.
I. Grout bearing plates on concrete to exact level required with grout and support on steel wedges until grout has set hard.

3.3 SHOP PAINTING: Shop paint all structural steel work, except those members or portions thereof to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on the exposed portions and the initial 2" of embedded areas only. Do not paint surfaces which are to be welded.

A. Surface Preparation: Before painting, thoroughly clean all surfaces of all grease, rust, welding droppings and loose mill scale by methods conforming to SSPC-SP-1 SSPC-SP-3. After erection, wire brush and touch-up welded or abraided areas with primer.
B. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of 2.0 mils. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

3.4 TOUCH-UP PAINTING: Cleaning and touch-up painting of field welds, bolted connections and abraided areas of the shop paint on structural steel is included in Section 09900.

END OF SECTION

SECTION 05500

METAL FABRICATIONS AND MISCELLANEOUS METAL WORK

PART 1 GENERAL

1.1 SCOPE: Provide metal fabrications and miscellaneous metal work, complete, including:
- A. Railings.
- B. Metal supports for work of other trades.
- C. Furnish miscellaneous metal or steel attachments, anchors, plates, angles, etc.
- D. Include anchors, angles, bolts, expansion shields for items in this section only, and other accessories shown in details and/or required for complete installation of all work.

1.2 SUBMITTALS: Comply with Section 01300. Submit shop drawings for the fabrication and erection of all assemblies of miscellaneous metal work. Include plans, elevations and details of sections and connections. Show anchorage and accessory items.

PART 2 PRODUCTS

2.1 MATERIALS
- A. Miscellaneous Steel Bars, Rods and Shapes: ASTM A36, A283, A108, A663, A501 and A575 as applicable.
- B. Steel Pipe: ASTM A53 black finish steel pipe, standard weight (Schedule 40).
- C. Bolts and Nuts: ASTM A307, Grade A. High strength bolts; ASTM A325. Hot-dip galvanize all items in accordance with ASTM A153.
- D. Expansion Bolts Wedge Anchors: Ramset "Trubolt" or Hilti "Kwik Bolt".
- E. Expansion Shields: F.S. FF-S-325.
- F. Anchor Bolts: Furnish and deliver to site, anchor bolts and other items to be embedded in concrete. Provide necessary shop details and diagrams for concrete forms and, if required, provide templates to ensure proper and accurate locations and setting of anchor bolts.
- G. Toggle Bolts: Tumble-wing type F.S. FF-B-588 type, class and style as required.
- H. Lock Washers: F.S. FF-W-84, helical spring type carbon steel.
- I. Miscellaneous Items: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous metal shapes as required for framing and supporting woodwork and for anchoring or securing woodwork to concrete or other structures.
- J. Shop Paint: Lead free, alkyd primer; Tnemec 10-99, Southern Coatings Enviro-Guard 1-2900, or approved equal, meeting performance requirements of F.S. TT-P-86, and passing ASTM B 117 after 500 hours. Primer selected must be compatible with finish paint requirements specified in Section 09900.
- K. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel work, complying with SSPC- Paint 20.

2.2 FABRICATION
- A. Workmanship: Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- C. Weld corners an seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws

or bolts. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use. Cut reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

E. Shop Painting:
   1. Shop paint miscellaneous metal work, except concealed metal work, members or portion of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified.
   2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 or SSPC-3.
   3. Remove oil grease and similar contaminants in accordance with SSPC SP-13.
   4. Immediately after surface preparation, brush or spray o primer in accordance with manufacturer's instructions, and at rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.

2.3 MISCELLANEOUS METAL FABRICATIONS

A. Pipe Railings: Steel or aluminum pipe as indicated on drawings, with fittings and brackets as variously detailed, of sizes indicated, neatly welded and all welds dressed smooth. Prime as specified in this section.

B. Metal Supports: Provide structural steel lintels, channels, braces, angles, etc., as indicated and assemble as detailed. Secure all connections to provide rigid supports for all items required including supports not specifically specified in other sections.

PART 3 EXECUTION

3.1 PREPARATION: Furnish setting drawings, diagrams, templates, instructions and directions for installation of anchorages. Coordinate delivery of such items to site.

3.2 INSTALLATION

A. Perform cutting, drilling and fitting required for installation; set work accurately in location, alignment and elevation, plumb, level and measured from established lines and levels. Provide anchorage devices and fasteners where necessary for installation to other work.

B. Use care in handling and erection so as not to marr, abrade or stain finished surfaces. Where aluminum is to be placed in contact with steel, concrete or other dissimilar materials, back paint the aluminum before erection with acceptable bituminous paint.

C. After erection, adequately protect exposed parts of work from damage. After completion of other work in the vicinity, thoroughly clean finished surfaces.

3.3 TOUCH-UP SHOP PAINTING: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Use galvanizing repair paint on damaged galvanized surfaces.

END OF SECTION

DIVISION 6 WOOD AND PLASTIC

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Wood Structure.
- B. Concealed framing bracing, studs.
- C. Exposed framing, fascia and trim.
- D. Plywood roof and wall sheathing.
- E. Braces, stripping, cants, grounds, and nailers indicated or necessary to install millwork, cabinetwork, toilet room accessories, and to receive or back work of other trades.
- F. I-joists
- G. Engineered Wood
- H. Joist Hangers

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Finish Carpentry; Section 06200.

1.3 QUALITY ASSURANCE
- A. Grading Marks: Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency identification; and submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.
- B. Wood Preservative Treatment: Label each piece of pressure treated lumber and plywood with the Quality Control mark of the American Wood Preservers Bureau showing compliance with the appropriate standard.

1.4 PRODUCT HANDLING
- A. Keep carpentry materials dry during delivery, storage and handling. Store lumber and plywood in stacks for air circulation within stacks. Protect bottom of stacks against contact with damp surface. Protect exposed materials against weather. Do not store dressed or treated lumber or plywood outdoors.

PART 2 PRODUCTS

2.1 SOFTWOOD
- A. Comply with standards of SPIB "Standard Grading Rules for Southern Pine Lumber" for Southern pine and WCLIB "Standard Grading Rules for West Coast Lumber" for Douglas Fir.
  1. For structural lumber 2" to 4" thick, 6" and wider, use KD, S4S Southern pine or Douglas fir No. 2
  2. For structural light framing 2" to 4" thick, 2" to 4" wide, use KD, S4S Southern pine or Douglas fir No. 2.
  3. For studs, use KD S4S Southern pine or Douglas fir No. 2.
  4. For light framing 2" to 4" thick, 2" to 4" wide, use KD, S4S.
  5. For finish lumber, use KD, S4S, Southern pine or Douglas fir. C&BTR, vertical grain.

2.2 SOFTWOOD PLYWOOD
- A. Comply with PS-1, Exposure 1 (exterior glue), Group 1, Southern pine or Douglas fir.
  1. Roof Sheathing: C-D grade, APA rated sheathing 40/20.
- B. Note: At Contractor's option, oriented strand board equivalent to specified requirements for plywood may be used for plywood roof sheathing.

2.3 ENGINEERED WOOD
- A. Provide 11-7/8” x 1-3/4” I-Joist per drawings, standard class, equal to joists manufactured by Boise Cascade.
- B. Provide 11-7/8” x 1-3/4” LVL’s per drawings equal to LVL's manufactured by Boise Cascade.

2.4 ROUGH HARDWARE
- A. Nails, metal connectors, bolts, screws, staples, and other fasteners (except as specified or noted otherwise);

hot-dip galvanized steel.
1. Joist hangers for 11-7/8" I-Joists-Simpson No. IUS1.81/11.88
2. Beam Hangers Simpson No. IUS3.56/11.88
   a. Install hangers per Simpson Strong Tie instructions for each hanger listed.

B. Screws used in finish carpentry; brass, exposed screws N.P. oval head with N.P. finish washers.

2.5 PLYWOOD "H" CLIPS: Simpson PSC, 18 gage steel, galvanized.

2.6 WOOD PRESERVATIVE TREATMENTS

A. Pressure treat above-ground items with water-borne preservatives complying with AWPB-LP-2. After treatment, kiln dry lumber and plywood to maximum moisture content, respectively, of 19 percent and 15 percent. Treat items as follows:
1. Wood cants, nailers, curbs, blocking, stripping and similar members adjacent to roofing and flashing.
2. Wood sill, sleepers, blocking, furring, stripping and similar concealed members in contact with concrete.
3. Wood framing members less than 18" above grade.
4. Wood floor plates installed over concrete slabs directly in contact with earth.

PART 3 EXECUTION

3.1 WORKMANSHIP: Erect all work accurately to required lines, level, plumb, to true lines, and rigidly secured.

3.2 ROUGH CARPENTRY: Provide wood grounds, strips, backing, and blocking of thickness and shape required to secure work and equipment in place, as indicated on the drawings or required by conditions. Fasten wood grounds, furring and other engaging woodwork to various types of walls with approved types and sizes of nails, ties, and inserts, spaced to provide rigid secure supports.

3.3 WOOD FRAME ROOF CONSTRUCTION

A. Roof Sheathing: 5/8" thick. Install with face grain across supports; locate and stagger joints over supports. Nail with 10d common nails at 4"oc for panel ends and roof perimeter, Nail with 10d common nails at 6"oc for intermediate supports or as indicated on drawings. At unsupported edges use plywood sheathing clips, one between trusses.

3.4 WOOD FRAME FLOOR CONSTRUCTION

A. Floor decking: 3/4" thick tongue and groove plywood, APA rated Sturdi-Floor 48/24. Glue and screw to framing substrate. Provide rubber bearing cushions where wood floor framing members are to rest on concrete floors.

3.5 WOOD FRAME WALLS AND PARTITIONS

A. Stud Framing: 2" X 4" or 6", as indicated, spaced 16" o.c. Firestop, block, and brace as indicated or required to provide rigid support for wall hung fixtures, equipment, cabinets and accessories.

B. Fascia, Trim: Miter corners, ease edges.

3.6 ROUGH HARDWARE: Provide rough hardware necessary or required for installation of the work specified. Use sufficient size and number of spikes, nails, screws, bolts, etc. to ensure rigidity, security and permanence.

3.7 CLEAN-UP: Remove from the premises all rubbish, debris and unused materials which may be accumulated during the progress of the work.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Finish carpentry items, other than shop prefabricated casework; hardware and attachment accessories. Provide wood trim to cover all gaps and cracks and at all inside and outside corners in order to ensure neat and finished appearance.

1.2 QUALITY ASSURANCE
- A. Perform work in accordance with AWI Custom quality standards.

1.3 SUBMITTALS: Comply with Section 01300
- A. Shop drawings: Indicate materials, component profiles, fastening methods, jointing details, finishes and accessories.
- B. Samples: Submit two 4" x 4" size samples illustrating wood grain and specified finish.

1.4 REGULATORY REQUIREMENTS
- A. Conform to applicable code for fire retardant requirements.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS
- A. Softwood Lumber: Graded in accordance with AWI Custom pine or fir species, maximum moisture content of 6 percent; with mixed grain.
- B. Hardwood Lumber: Graded in accordance with AWI Custom oak species, maximum moisture content of 6%; with mixed grain.

2.2 SHEET MATERIALS
- A. Softwood Plywood: PS 1 Grade C-D, Graded in accordance with AWI, lumber core, pine or fir face species.
- B. Hardwood Plywood: Graded in accordance with AWI, lumber core, oak face species.
- C. Wood Particleboard: AWI standard, composed of wood chips made with waterproof resin binders, sanded faces.
- D. Hardboard: Pressed wood fiber with resin binder; service grade.

2.3 FINISH MATERIALS
- A. Plastic Laminate: NEMA LD 3, standard general purpose grade for vertical work. As manufactured by Nevamar, Formica, Wilson Art or approved equal.

2.4 ACCESSORIES
- A. Fasteners: Size and type to suit application; galvanized steel for exterior, high humidity and treated wood locations, plain finish elsewhere.
- B. Contact Adhesives: Complying with CS 35, Type I.
- C. Wall Adhesive: Cartridge type, compatible with wall substrate, capable of achieving durable bond.
- D. Primer: Alkyd primer sealer.

2.5 FABRICATION
- A. Fabricate to AWI Custom standards.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Prime paint surfaces of items or assemblies in contact with cementitious materials, before installation.

3.2 INSTALLATION

A. Set and secure materials and components in place, plumb and level.
B. Install trim by nails or screws.
C. Cover exposed edges of shelving with 3/8 inch (10 mm) thick hardwood edging.
D. Apply plastic laminate finishes with adhesive over entire surface.
E. Install hardware in accordance with manufacturer's instructions.

3.3 PREPARATION FOR FINISH

A. Sand work smooth and set exposed fasteners. Apply wood filler in exposed fastener indentations.

END OF SECTION

SECTION 06400

INTERIOR ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Architectural woodwork items, including cabinetwork, countertops, standing and running trim, paneling and hardware.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Finish Carpentry: Section 06200.
- B. Painting: Section 09900.

1.3 QUALITY ASSURANCE
- A. Cabinet Material and Fabrication Standards: Custom grade for transparent finish and laminated plastic countertops, in accordance with the latest edition of the Architectural Woodwork Institute Quality Standards and Guide Specifications, conforming to the following sections except where modified elsewhere in this section.
  1. Section 100 - Lumber
  2. Section 200 - Panel Products
  3. Section 300 - Standing and Running Trim
  4. Section 400 - Architectural Cabinets
  5. Section 500 - Paneling
  - B. Fabrication of architectural woodwork to be by a single firm.

1.4 SUBMITTALS: Comply with Section 01300
- A. Product Data: Submit manufacturer's product data for each product and product specified as work of this section and incorporated into items of architectural woodwork during fabrication, finishing and installation.
- B. Shop Drawings: Prior to fabrication, submit shop drawings indicating location, material quality and species, fabrication and assembly details.
- C. Samples: Submit samples, in full color and pattern ranges for Architect's selection, for plastic laminate and wood stain.

1.5 DELIVER, STORAGE, AND HANDLING: Deliver, store and handle architectural woodwork in a manner to prevent damage and deterioration.

PART 2 PRODUCTS

2.1 MATERIALS: Conform to Sections 100 and 200 of reference standard, except as modified below.
- A. Exposed Solid Wood for Transparent Finish: Red oak, plain sawn vertical or flat grain.
- B. Solid Wood for Semi-exposed Members: Same as exposed members.
- C. Solid Wood for Concealed Members: Southern Pine or Douglas fir.
- D. Exposed Plywood for Transparent Finish: To match exposed solid wood; plain sliced.
- E. Exposed Plywood for Laminated Plastic Finish: Hardwood. Use plywood bonded with exterior glue.
- F. Semi-exposed Plywood: Same as exposed plywood.
- G. Concealed Plywood: Southern pine or Douglas fir.
- H. Particleboard: CS 236, Type 1B2, with filled surface and edges.
- I. Laminated Plastic: NEMA LD-3, standard general purpose grade for horizontal work. Nevamar, Formica, Wilson Art, Formica or Nevamar approved equal.
- J. Adhesive: Complying with CS 35, Type I.
- K. Moldings: Red oak as specified above, shapes and dimensions as indicated on drawings.
- L. Fasteners And Anchors: Screw (F.S. FF-S-111), nails (F.S. FF-N-105), and anchors and expansion bolts of material, type, and finish required for each use and for secure anchorage.

2.2 HARDWARE
- A. Cabinet Doors:

1. 1 pr. of concealed & adjustable, self closing hinges, at top and bottom of door.
2. 1 – 3” wire pull, brushed aluminum finish

B. Cabinet Drawers:
1. 1 pr. drawer slides, KV1300 (length as required)
2. 1 – 3” wire pull, brushed aluminum finish.

C. Adjustable Shelves: KV 255 with 256 clips.

2.3 FARICATION AND MANUFACTURE: Comply with specified sections of referenced standard, except do not use staples in exposed millwork construction.

A. Cabinetwork Design: Reveal overlays; fabricated as detailed.

B. Laminated Plastic Countertops: Waterproof glued to 3/4" exterior grade plywood, or where structurally adequate, mounted on 3/4" thick medium density particleboard with waterproof adhesive recommended by plastic laminate manufacturer. Provide self-edged and post formed exposed edges, as indicated. Install sheets in single pieces up to limits of sheet sizes; small patches will not be accepted.

C. Paneling: Plywood; book-matched adjacent veneer leaves, running match veneer within panel face; pre-manufactured sets used full width for panel matching method.

PART 3 EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

B. Prior to installation, examine shop fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops); and with no variations in flushness of adjoining surfaces.

B. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is specified.

D. Standing and Running Trim: Install with minimum number of joints possible, using full length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners and comply with referenced standards for joinery.

E. Cabinets: Install without distortions so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items. Maintain veneer sequence matching of cabinets.

F. Countertops: Anchor securely to base units and other support systems.

G. Paneling: Install with minimum of exposed face fastening. Use interlocking wood cleats or metal hanging clips combined with accurate furring and shimming.

3.3 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

A. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

B. Clean hardware, lubricate and make final adjustments for proper operation.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.

D. Protection: Provide final protection and maintain conditions necessary to ensure that the work will be without damage or deterioration at the time of acceptance.

END OF SECTION

DIVISION 7 THERMAL AND MOISTURE PROTECTION

SECTION 07210

BUILDING INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

B. See Section 07211 for Metal Building Roof Insulation

1.2 SUMMARY

A. This Section includes the following:

1. Thermal insulation in exterior walls and exposed in plenums, foil faced blanket/batt type.
2. Thermal insulation at soffits, below conditioned spaces, foil faced blanket/batt type.
3. Acoustic insulation at interior partitions, unfaced blanket/batt type.
4. Vapor/moisture barrier membrane

B. Metal Flashing is specified in Division 7.

1.3 DEFINITIONS

A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract Division 1 "Submittals".

B. Product Data from manufacturers for each type of insulation product specified.

C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including R-value, fire performance characteristics, perm rating, water absorption ratings, and other properties, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristic: American Society of Testing and Materials (ASTM) E 84.
2. Fire Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation and membrane materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide insulation products of one of the following:
   1. Manufacturers of Glass Fiber Insulation:
      a. Manville: Building Insulations Div., Manville Sales Corp.
      b. Owens/Corning Fiberglas Corp.
      c. U.S. Gypsum Co.
      d. Or equal

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

B. Foil-faced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining glass fibers with thermosetting resins to comply with ASTM C 665 for Type III, Class A; foil vapor-retarder facing on one side with maximum flame spread and smoke developed values of 25 and 50, respectively; and as follows:
   1. R-Values: Exterior Walls & Soffits: R-19
   2. R-Values: Above Acoustical Ceilings: R-19

C. Unfaced Acoustical Mineral Fiber Blanket/Batt Insulation: Acoustical insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for type I (blankets without membrane facing); and as follows:
   1. Mineral Fiber Type: Fibers manufactured from glass.
   2. Thickness and locations as noted on the drawings and schedules.
   3. Acoustical insulation which is exposed above ceiling areas, and is not concealed within walls, shall be foil faced per 2.02.B above.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with requirements of the Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

3.3 INSTALLATION, GENERAL

B. Comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.

C. Extend insulation full thickness as indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement.

D. Apply a single layer of insulation of required thickness.

3.4 INSTALLATION OF BUILDING THERMAL INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, use mechanical anchorage to provide permanent placement and support of units.

B. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for fire stopping.
   1. Tape holes and ruptures in vapor retarder, and seal insulation to penetrations.

3.5 INSTALLATION OF ACOUSTICAL INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, use mechanical anchorage to provide permanent placement and support of units.

3.6 VAPOR/MOISTURE BARRIER MEMBRANE

A. Install membrane per manufacturers recommendations in shingle-like manner beginning at bottom of wall or roof. Extend membrane 6" minimum beyond edges and lap membrane to prevent water penetration into stud cavity. Laps of membrane shall not align with joints in substrate/sheathing or finish surface.
   1. Extend membrane 6" minimum beyond edge of substrate/sheathing/finish and lap membrane at substrate/sheathing/finish edges.
   2. Membrane shall lap under sills of windows on top of stud framing.
   3. Membrane shall be applied around jambs of openings to lap window & door frames a minimum of 6”.
   4. Membrane shall be applied around head of opening framing and lap over head flashing a minimum of 6”.
   5. At expansion joints, extend membrane into joint between studs to form a minimum 1 1/2" bellows, which will allow expansion & contraction of joint without damage to membrane and without compromising system. No vertical seams or laps are allowed at or within 24 inches of an expansion joint.
   6. Lap membrane over/passed stud wall bottom sill and edge of concrete slab. Coordinate with finish, plaster and adhered manufactured stone. At locations of adjacent concrete paving, extend membrane into expansion joint, behind filler material, passed surface of concrete paving.

B. Secure membrane with fasteners over substrate/ sheathing. All laps and seams shall be secured and sealed with tape as recommended by manufacturer.

C. Coordinate installation of vapor/moisture barrier membrane with sheet metal flashing, exterior sheathing, EIFS and window system flashing for proper sequencing to provide proper lapping to insure a watertight system.

3.7 NOT USED

3.8 PROTECTION

A. General: Protect installed insulation and membranes from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

B. Replacement: Insulation or membranes damaged during construction or failing to meet fire ratings shall be removed and replaced with undamaged insulation or membranes at no additional cost to the Owner.

END OF SECTION 07210

SECTION 07211

PRE-ENGINEERED METAL BUILDING INSULATION SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Roof - Energy Saver FP System (or approved equal)
- B. Walls - Metal building insulation.

1.2 ENVIRONMENTAL REQUIREMENTS
- A. Install insulation adhesives in accordance with manufacturer's instructions.

1.3 LOCATION REQUIREMENTS
- A. Provide an approved system to the entire roof of building.
- B. Provide wall insulation as specified.

PART 2 PRODUCTS

2.1 ENERGY SAVER SYSTEM MATERIALS
- A. Steel strap: 50 KSI tempered, high tensile strength steel, galvannealed, primed and painted of fabric.
  1. Minimum size shall be .022" thick x 1" wide x continuous width.
- B. Fasteners: 12-14 TY3 ¾" self-drilling fasteners with ¾" OD washers for up to ¼" thick, light gauge steel. For heavier gauge steel, up to 3/8", use 12-24 TY5 1 ¼" self drilling fasteners with a banding clip. All fasteners shall be colored to match fabric color. Banding clips are to be installed per manufacturer's instructions.
- C. Sealants: Shall be fast-tack solvent-based synthetic rubber adhesive for sealing fabric laps and edges. Two sided tape approved by manufacturer may be substituted for synthetic rubber adhesive.
- D. Insulation: Minimum R-value to be at or above an actual R-38 and shall be a combination of unfaced in the purlin cavity and faced over the purlins(between purlins and the roof sheets).
  1. Purlin cavity insulation shall be fiberglass blanket insulation meeting ASTM C 991, Type 1 (unfaced) and ASTM E136, or other insulation form as may be recommended and submitted by manufacturer and approved by the Construction Manager during submittals. Fiberglass blanket shall be rated FHC 25/50 with a flame spread rating of 25 or less and a smoke developed rating of 50 or less, tested in accordance with ASTM E 84.
     a. Minimum actual R-value to be 25.
  2. Over the purlin insulation shall be flexible fiber glass metal building insulation as manufactured in accordance with ASTM C 991, Type II (Faced), "Standard Specification for Flexible Insulation for Pre-Engineered Metal Buildings", having an R value of 13 roof. See 2.3.B for facing material.
     a. Minimum actual R-value to be 13.
- E. Fabric: Woven reinforced high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film. This material is manufactured in large custom fit pieces by hot air welding from roll goods. Pieces are to be fabricated to substantially fit the large defined building areas with minimum practical sealing to be done on job site. Fabric to be folded or rolled to allow for rapid pullout on the strap support system.
  1. Coating thickness: 1.5 WFR WHT/1.25 WFR LT GRY (+/- 10%)
  2. Weight: 4.65 oz/sq. yd. (+/- 10%, ASTM D-1910)
  3. Tensile Strength: 175 lbs. warp x 156 lbs weft (ASTM-d751, Grab)
  4. Elongation: 31% warp x 26% fill.
  5. Tear Strength: 56 lbs warp x 51 lbs weft (ASTM D-751, Tounge)
  6. Moisture Vapor Transmission: .015 (ASTM E-96, Method A)
  7. Thickness 7.5 Mils (+/- 10%)
  8. Mullen Burst: 270 psi (ASTM D-751)
  9. Puncture Resistance: 81 lbs (ASTM D-4833)
  10. Flame Resistance: Flame Spread – 5/smoke developed-20 (ASTM E-84) NFPA 701-Pass
  11. Sound Absorption: NRC Rating 0.70 (ASTM C-423-02a)
  12. UV Weathering: UV stabilizers added for extra protection.
  13. Cold Temperature Flexibility: -55 degress Fahrenheit (ASTM D-2136)

2.2 MISCELLANEOUS MATERIALS:

A. Provide adhesive for bonding insulation, mechanical anchors or other required items as recommended by the insulation manufacturer.

2.3 BUILDING WALLS MATERIALS

A. The insulation shall be flexible fiber glass metal building insulation as manufactured in accordance with ASTM C 991, Type II (Faced), "Standard Specification for Flexible Insulation for Pre-Engineered Metal Buildings", having an R value of 13 for the walls.

B. The insulation shall be faced with “Standard Duty Polypropylene Scrim Kraft" (Lamtec WMP-10, or Compac MB2001),or equal. The permeance rating shall not exceed.02 when tested in accordance with ASTM E 96 (Dessicant Method), "Standard Test Methods for Water Vapor Transmission of Materials".

C. The composite product shall have a fire hazard classification of 25 (maximum) flame spread index, and 50 (maximum) smoke developed index (FHC 25/50) when tested in accordance with ASTM E 84 or UL 723.

PART 3 EXECUTION

3.1 INSTALLATION: Comply with manufacturer's instructions. Extend insulation full thickness over entire surface to be insulated. Cut and fit tightly around obstructions and fill voids with insulation.

END OF SECTION

SECTION 07240

EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Composite wall cladding system of rigid insulation and synthetic plaster finish.

1.2 SYSTEM DESCRIPTION
- A. Exterior Insulation and Finish System: EIMA Class PB Type A system consisting of an insulation board, base coat with reinforcing mesh and textured finish coat.

1.3 PERFORMANCE REQUIREMENTS: Conform to the following performance standards in accordance with test methods indicated.
- A. Accelerated Weathering: ASTM G-23, minimum of 2,000 hours with no cracking, flaking, peeling or other deleterious effects.
- B. Salt Spray Resistance: ASTM B117, minimum of 300 hours with no deleterious effects.
- C. Mildew Resistance: Mil. Std. 810-B, Method 508, finish coat only; no growth of mildew or fungus.
- D. Wind Driven Rain: F.S. TT-C-555B; no visible leaks, blistering, cracking or wear of finish coat, less than .2 lbs. Weight gain.
- E. Abrasion Resistance: ASTM D-698; no cracking, checking or loss of film integrity.
- F. Impact Resistance: ASTM D-2794; no cracking at 30"/lb.
- G. Windload Resistance: ASTM E330; no delaminating at 100 psi positive and negative wind load pressure.
- H. Full Scale Multi-Story Fire Test: UBC 17-6; no flame propagation.

1.4 QUALITY ASSURANCE
- A. EIFS System Manufacturer Requirements: Member of EIMA and current manufacturer of EIFS systems for minimum of 5 years.
- B. EIFS System Installer Requirements: Currently approved in writing by EIFS System manufacturer and must have reputation for performing satisfactory work and have successfully completed work comparable to this project.

1.5 SUBMITTALS
- A. Shop Drawings: Provide shop drawings indicating wall and soffit joint layouts and joint details, interface of this work with adjacent work and also all high impact areas which will be provided with extra reinforcing mesh as specified below.
- B. Product Data: Provide data on system materials, product characteristics, performance criteria and limitations. Include the following:
  1. Materials list of items proposed.
  2. Manufacturer's specifications and other data necessary to determine compliance with specified requirements.
  3. Manufacturer's complete range of standard and custom colors.
  4. Sealant product data.
  5. Manufacturer's recommended installation instructions.
- C. Samples: Submit one panel, 12 inches x 12 inches illustrating coating texture range for selection.
  1. After color and texture selection, submit one 12" x 12" sample panel for each separate color and texture combination.

1.6 ENVIRONMENTAL REQUIREMENTS
- A. Do not install finish when ambient temperature is below 40 degrees F (5 degrees C).
- B. Maintain this temperature during and 24 hours after installation of finish.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Deliver products to the project site in manufacturer's original, unopened containers.
- B. Store products in a cool, dry area out of direct sunlight, protected from environment.

1.8 MAINTENANCE MATERIALS

A. Upon completion of work, deliver to the Owner at the job site a maintenance kit including:
   1. Printed maintenance instructions.
   2. One gallon of the approved adhesive.
   3. One gallon of the approved finish for each color installed, and from the same batch as the installed finish.
   4. Twenty square feet of each of the approved reinforcing fabrics.
   5. Twenty square feet of the approved insulation board.

PART 2 PRODUCTS

2.1 MATERIALS

A. The Exterior Insulation and Finish System shall be as manufactured by Dryvit Systems, Inc. "Outsulation System". All components of the system shall be obtained from Dryvit or it's authorized distributors. Equal products by the following manufacturers will be acceptable: Corev America Inc. “Precor” and STO Industries “R-Wall”.

B. Molded Polystyrene Board Insulation Type A: ASTM C578, molded bead type, conforming to the following:
   1. Thermal Resistance: R of 3.7 per inch thickness @ 75 degrees F.
   2. Thickness: Thickness dimension indicated on drawings or specified here.
   3. Thickness Tolerance: 1/16 inch.
   4. Compressive Strength: 10 psi minimum.
   5. Water absorption: In accordance with ASTM C-272; 3.0% maximum by volume.
   6. Edges: Square.
   7. Flame/Smoke Properties: 25/450 in accordance with ASTM E84.

C. Insulation Adhesive and Primer/Base Coat shall be as recommended by EIFS system manufacturer.

D. Coating Reinforcement: Glass fiber mesh type, woven, treated for improved bond with coating, 6 oz per square yard weight and 20.5 oz per square yard weight for extra reinforcing at high impact areas.
   1. High impact areas shall be designated as all EIFS surfaces which are within 8 feet vertical from grade or any adjacent walkway as well as any other areas indicated as such on the drawings.
   2. High impact areas shall be provided with an extra layer of reinforcing mesh (20.5 oz per square yard weight) in addition to the regular reinforcing mesh layer (6 oz per square yard weight).

E. Coating: EIFS system manufacturer’s synthetic, water base, acrylic coating with integral color and texture as selected by the Architect.

2.2 ACCESSORIES

A. Perimeter Trim and Control Joints: Extruded plastic with attachment flanges.

B. Mechanical Insulation Fastening: Fastenings with washers and non-corrosive fasteners.

C. Sealant Materials: As recommended by coating manufacturer.

D. EIFS approved vapor barrier: At Contractor’s option, one of the two following procedures which are approved and satisfies the warranty requirements of EIFS system manufacturer shall be used:
   1. Backstop the “Densglas” substrate, consisting of taping the joints and coating the entire surface of the densglas substrate with a trowel applied, approved coating before attaching the foam board with adhesive.
   2. Installing a Tyvek air barrier product manufactured for EIFS systems over the densglass densglas substrate before attaching foam which requires screw attachment for the foam board instead of gluing.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate and adjacent materials are clean, dry and within the tolerances and specifications recommended by the EIFS system manufacturer.

B. Correct any improper conditions or other deficiencies including:
   1. Wet or delaminated gypsum sheathing.
   2. Substrate conditions not in accordance with EIFS manufacturer’s recommendations.
   3. Coatings, hot spots, releasing agents, oils or any other residue on substrate which adversely affect

the adhesive bond.

4. Planar irregularities greater than 1/8".

3.2 INSTALLATION - GENERAL

A. Install Exterior Insulation and Finish System in accordance with manufacturer's application instructions.

B. Contractor shall be knowledgeable in the proper installation of the Dryvit Outsulation System and shall be experienced and competent in the installation of Exterior Insulation and Finish Systems. Additionally, the contractor shall possess a current trained contractor certificate from Dryvit.

3.3 INSTALLATION - INSULATION BOARD

A. Install insulation board in accordance with manufacturer's instructions.

B. Install insulation boards on wall surface horizontally from a level base line.

C. Place boards in a method to maximize tight joints. Stagger vertical joints. Butt edges and ends tight to adjacent board and to protrusions.

D. Depending on the method of approved insulation board attachment selected by the Contractor, secure boards to substrate by mechanical attachment or by full bed of adhesive to achieve a continuous flush insulation surface.

E. For adhesive attachment option:

1. Precut boards to fit around openings and projections.
2. Secure boards to substrate by full bed of adhesive applied uniformly over entire surface of insulation board with a 3/8" notched trowel to achieve continuous flat, flush surface for coating application.
3. Apply sufficient pressure over the entire surface of each board to achieve uniform contact and high initial grab.
4. Where surface irregularities are found to exist, use a suitable rasp to smooth the surface flat and flush within a tolerance of 1/16" maximum.

3.4 INSTALLATION - BASE COATING

A. Install primer/adhesive, base coat, coating and glass fiber mesh reinforcement in accordance with manufacturer's instructions.

B. Apply primer/adhesive to a minimum thickness of 1/16" and fully embed reinforcement, wrinkle free.

C. Lap reinforcement edges and ends 2 inches.

D. Install expansion joints, rustication joints and other required items completely embedded in mixed adhesive.

3.5 INSTALLATION - FINISH COATING

A. Do not commence application of finish coat until base coat is dry and cured.

B. Apply and level finish coat in same operation.

C. Apply finish coat to a minimum thickness of 1/16".

D. Apply and texture surface in a continuous operation, maintaining a wet edge. Work to corners and predetermined joints.

E. Use sufficient staging, scaffolding and personnel to accomplish an even and uniform appearance.

F. Achieve final texture and color to match approved sample.

G. Apply sealant at finish and perimeter control joints.

3.6 CLEANING AND PROTECTION

A. All excess materials shall be removed from the job site in accordance with the contract provisions and as required by applicable law.

B. All surrounding areas where the EIFS system has been installed shall be left free of debris and foreign substances resulting from the work.

C. The system shall be protected from weather, staining and any other damage until permanent protection in the form of flashings, sealants, etc. are installed and further until substantial completion of the project.

END OF SECTION

SECTION 07620

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SCOPE: Provide sheet metal work, complete.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Sealants; Section 07900.
- B. Thru-Wall Flashing: section 04200.

1.3 SUBMITTALS: Comply with Section 01300. Prior to fabrication, submit shop drawings for each typical sheet metal item indicating materials, gages, jointing, and fastening.

1.4 JOB CONDITIONS: Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

PART 2 PRODUCTS

2.1 MATERIALS
- A. Sheet Metals:
  - 1. Aluminum Sheets: ASTM B 209, alloy 3003, temper #14, mill finish, .032" thick, mill finish.
  - 2. Pre-painted Steel Sheets: 24 gage hot dipped galvanized steel (G90) commercial quality, primed and finished one side with Kynar base fluoropolymer coating 1.0 mil total dry film thickness, and with wash coat on reverse side. Custom colors as selected by Architect. Coat pre-painted side with liquid applied factory installed strippable film for protection of finished surface. Vincent "ColorKlad" or Peterson "PacClad".
- B. Solder: ASTM B 32; 50-50 tin/lead, with rosin.
- C. Nails, Screws, and Rivets: Same metal as flashing/sheet metal or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with materials being fastened.
- D. Roofing cement: ASTM D 2822, asphaltic.
- E. Mastic Sealant: polyisobutylene; non-hardening, non-skinning, nondrying, non-migrating sealant.
- F. Bitumastic Coating: SSPC - Paint 12, cold applied solvent type bitumastic coating for application in dry film thickness of 15 mils per coat.
- G. Sealants: As specified in Section 07900.
- H. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by manufacturer for non-moving joints including riveted joints.
- I. Paper Slip Sheet: 5-lb. rosin-sized building paper.
- J. Polyethylene Underlayment: 6 mil carbonated polyethylene film.
- K. Metal Accessories: sheet metal clips, cleats, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

2.2 FABRICATION
- A. Fabricate counterflashing, flashing, and other sheet metal work not exposed to view of aluminum. Fabricate flashing, trim, and other sheet metal work exposed to view of pre-painted steel sheets.
- B. Fabricate work to comply with "SMACNA" Architectural Sheet Metal Manual", metal manufacturer's recommendations, and recognized industry practices.
- C. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates.
- D. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.
- E. Fabricate pre-painted steel with strippable film in place. If soldering is necessary, mechanically remove coating. Touch up with color matched paint.
- F. Seams: fabricate nonmoving seams in sheet metal with flat-lock seams. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

G. Expansion Provisions: Where lapped or bayonet -type expansion provisions cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1" deep, filled with mastic sealant (concealed within joints).

H. Separate dissimilar metals from each other by painting each metal surface in area of contact with a heavy application of bitumastic coating, or by other permanent separation as recommended by manufacturers of dissimilar metals.

I. Fabricate without horizontally flat (unpitched) surfaces which do not readily allow water to drain away from the work.

PART 3 EXECUTION

3.1 EXAMINATION: Examine substrates and conditions under which metal flashing and trim will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. SMACNA Details: Except as otherwise indicated or specified, comply with applicable recommendations and details of SMACNA "Architectural sheet Metal Manual".

B. Manufacturer's Recommendations: Except as otherwise indicated or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.

C. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

D. Underlayment: Where aluminum is to be installed directly on cementitious or wood substrates, install a course of paper slip sheet and a course of polyethylene underlayment.

E. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

F. Bed flanges and seal edges of metal flashing to substrates with roofing cement; install bed or bead of cement in manner which will maintain a watertight seal.

G. Remove strippable film from pre-painted steel work.

3.3 CLEAN-UP: After completion of work, clean roofing cement, sealant and bituminous paint form flashing, floors, and all surfaces so defaced. Remove all excess materials and scraps from the job and leave all surfaces neat and clean.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 GENERAL

1.1 SCOPE: Provide firestopping and smokeseals, complete. Work includes the following:
- A. Openings in fire-rated floors and walls, both empty and those accommodating penetrating items such as cables, conduits, pipes, and ducts.
- B. Expansion joints in fire rated walls and floors.
- C. Openings in smoke partitions.

1.2 SUBMITTALS: Comply with Section 01300
- A. Product Data: Submit data on product characteristics, performance and limitation criteria. Include manufacturer's preparation and installation instructions for each type of firestop required.
- B. Certification: Submit certification that firestop products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE
- A. Provide materials conforming to Flame (F) and Temperature (T) ratings as tested by nationally accepted testing agencies per ASTM E 814 or UL 1479 fire tests. The F and T rating must be a minimum of one hour but not less than the fire resistance rating of the assembly being penetrated. Conduct fire test with minimum positive pressure differential of 0.03" of water column.
- B. Provide firestopping by contractor trained and approved by firestop manufacturer; use equipment approved by manufacturer.

1.4 PROJECT CONDITIONS
- A. Coordinate work with work of related trades to properly execute work and to maintain fire rating of walls and floors where firstopping and smokeseals are applied; sequence work to permit firestop materials to be installed after adjacent and surrounding work is complete.
- B. Maintain temperatures of substrate materials and ambient air temperatures as recommended by manufacturer; provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Bio Fireshield is specified; equivalent materials of other manufacturers will be considered.

2.2 MATERIALS
- A. General:
  1. Provide materials that are asbestos free.
  2. Provide materials with minimum F and T rating of one hour, but not less than fire resistance rating of assembly being penetrated, as tested per ASTM E 814.
  3. Provide materials conforming to governing codes.
- B. Firestop Sealant: Biotherm Firestop Sealants; single component silicone, gun grade for walls and overhead applications (Biotherm 100) and self-leveling for floor applications (Biotherm 200).
- C. Firestop Mortar:
  1. Novasit K-10 Firestop Mortar; single component portland cement flay ash mortar.
  2. K-2 Firestop Mortar; portland cement based mortar.
- D. Firestop Sleeve: Firestop Sleeve; prefabricated, steel casing lined with intumescent material.
- E. Firestop Pillows: Firestop Pillows; fiberglass cloth bags filled with high temperature mineral wool coated with intumescent material.
- F. Firestop Mastic: RS90, single component, water based intumescent mastic sealant.
- G. Crash Foam System: Stainless steel housing lined with intumescent compound, with spring-loaded shutoff mechanism.
- H. Accessories:
  1. Dam Material: Mineral fiberboard, plywood or particleboard, sheet metal, or other approved material.
  2. Retainers, Clips: As recommended by firestop manufacturer.

3. Mineral fiber matting; safing.

PART 3 EXECUTION

3.1 EXAMINATION: Examine and verify that surface and condition of substrates have no defects or errors that would interfere with installation of firestopping materials. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 PREPARATION
- A. Clean surfaces and substrates of dirt, oil, loose material and other foreign materials which may affect proper bond and installation of firestops; comply with firestop manufacturer's recommendations.
- B. Provide primers required for various substrates and conditions as recommended by firestop manufacturer.
- C. Mask to protect adjoining surfaces.

3.3 INSTALLATION
- A. Install and cure in strict accordance with manufacturer's instructions; apply to provide rating of at least one hour but not less than fire resistance rating of assembly being penetrated.
- B. Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other materials used in actual fire test are installed.
- C. Install firestops with sufficient pressure to properly fill and seal openings to ensure effective smokeseal.
- D. Tool and trowel exposed surfaces.
- E. Remove excess firestop material promptly as work progresses and upon completion.
- F. Remove temporary dam material after initial cure of firestops.

3.4 CLEANING
- A. Where visible, clean adjacent surfaces of firestop materials.
- B. Correct staining and discoloring on adjacent surfaces.
- C. Remove debris and excess materials from site; leave work in neat and tidy conditions.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.1 SCOPE:

A. Completely close with sealant all joints. Include joints around frames of doors, windows, openings in exterior walls, flooring joints, joints at penetrations of walls, decks, and floors by piping and other services and equipment, joints between items of equipment and other construction, and other joints indicated or specified to be sealed.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Firestopping: Section 07840.

1.3 QUALITY ASSURANCE:

A. Obtain elastomeric materials only from manufacturer who will, if required, send a qualified technical representative to project site, for the purpose of advising the Installer of proper procedures and precautions for the use of the material.

1.4 SUBMITTALS: Comply with Section 01300

A. Product Data: Submit manufacturer's specifications, recommendations, and installation instructions for each type of sealant, calking compound and miscellaneous materials. Include letter of certification, or certified test laboratory reports indicating that each material complies with the requirements and is intended for the applications indicated.

B. Samples: Submit 12" long sample of each color required (except black) for each type of sealant or calking compound exposed to view. Samples will be viewed for color only.

1.5 JOB CONDITIONS

A. Examine joint surfaces, backing, and anchorage of units forming sealant rabbet. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Do not proceed with installations of sealants under adverse weather conditions, or when temperatures are above or below manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

PART 2 PRODUCTS

2.1 MATERIALS

A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. Provide in colors as selected by the Architect.

2.2 ELASTOMERIC JOINT SEALANTS:

A. Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those for Type, grade Class, and Uses.

1. Two-Or-More Component Nonsag Urethane Sealant: Type M, Grade NS, Class 25. Tremco "Dymeric", Sonneborn "NP-2", Pecora "Dynatrol II", or Mameco "Vulkem 227".
2. One-Component Nonsag Urethane Sealant: Type M, grade NS, Class 25. Sonneborn "Sonolastic NP 1", Tremco "Dymonic", Pecora "Dynatrol I", or Mameco "Vulkem 116".
3. One-Component pourable urethane Sealant: Type S, grade P, Class 25. Sonneborn "Sonolastic Paving Joint Sealant", Pecora "NR-201 Urexpan", or Mameco "Vulken 45".
4. One-Component Mildew-Resistant Silicone Sealant Type S, Grade NS, Class 25. GE "SCS 1702", Dow Corning "786", or Tremco "Proglaze White", or Pecora "863 #345 White".

2.3 ACRYLIC EMULSION SEALANT:

A. One component, nonsag, acrylic, paintable, mildew-resistant, complying with ASTM C 834. Tremco "Acrylic

Latex Caulk", Sonneborn "Sonolac", or Pecora Corp. "AC-20".

2.4 MISCELLANEOUS MATERIALS

A. Joint Cleaner: Type of joint cleaning compound recommended by the sealant or calking compound manufacturer for the joint surfaces to be cleaned.

B. Joint Primer/Sealer: Type recommended by the sealant manufacturer for the joint surfaces to be primed or sealed.

C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.

D. Sealant Backer Rod: Compressible rod stock polyurethane foam. Provide size and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

PART 3 EXECUTION

3.1 JOINT TYPES AND USAGES:

A. Calking and sealant usage is specified below.

1. Calking: All interior joints except joints with metal, aluminum, and wet work.
2. Sealants: Use multi-component or one-component non-sag polyurethane at all exterior joints and interior joints with aluminum and metal. Use mildew resistant silicone sealant at sinks and plumbing fixtures. Use minimum Shore A hardness pourable urethane sealant for horizontal joints subject to pedestrian and vehicular traffic.

3.2 JOINT SURFACE PREPARATION

A. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coating, moisture, and other substances which would interfere with bond of sealant.

B. For elastomeric sealants, do not proceed with installation of sealant over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating. Remove coating or treatment from joint surfaces before installing sealant.

C. Etch cementitious joint surfaces to remove excess alkalinity. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.

D. Roughen joint surfaces on non-porous materials, wherever sealant manufacturer's data indicates lower bond strength than for porous surfaces. Rub with fine abrasive cloth or wool to produce a dull sheen.

3.3 INSTALLATION

A. Comply with sealant manufacturer's printed instructions, except where more stringent requirements are indicated or specified and except where manufacturer's technical representative directs otherwise.

B. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

C. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.

D. Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

F. Install sealants to depths as shown or, if not shown, as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead.

1. For sidewalks and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, but neither more than 5/8" deep nor less than 3/8" deep.
2. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a

depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.

3. For joints sealed with non-elastomeric sealants, fill joints to a depth in the range of 75% to 125% of joint width.

G. Do not allow sealants to overflow or spill onto adjoining surfaces. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer or the sealant.

H. Remove excess and spillage of sealant promptly as work progresses. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to adjoining surfaces of finishes.

3.4 CURE AND PROTECTION:

A. Cure Sealants in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength, and surface durability. Cure and protect sealants in a manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION

DIVISION 8 DOORS AND WINDOWS

SECTION 08110

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SCOPE:
- A. Provide hollow metal frames, hollow metal doors, and related items required to complete work.
  - 1. Doors and frames requiring label rating are indicated on drawings and on Door Schedule.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Furnishing of finish hardware; Section 08705.
- B. Finish painting; Section 09900.
- C. Glass and glazing; Section 08800.

1.3 SUBMITTALS: Comply with Section 01300
- A. Product Data: Submit copy of manufacturer's technical data and installation instructions.
- B. Shop drawings: Prior to fabrication of work, submit shop drawings indicating gage of metals, details of construction including reinforcement for hardware, profile of moldings, connections to other work, fastenings and anchors.

1.4 QUALITY ASSURANCE
- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100), and as specified.
- B. Provide metal doors and frames manufactured by a single firm.
- C. Fire Rated Units: Provide fire-rated units complying with NFPA 80 "Standard for Fire Doors and Windows:, and units tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction. Labels must be affixed to the frame; do not paint labels.

1.5 DELIVERY, STORAGE AND HANDLING
- A. Deliver, handle, and store metal doors and frames in a manner to prevent damage and deterioration.
- B. Provide packaging such as cardboard or other containers, separators, banding, spreaders, and paper wrappings as required to completely protect metal doors and frames during transportation and storage.
- C. Store doors upright, in a protected dry area, at least 1" off ground with at least 1/4" air space between individual pieces. Protect primed and hardware surfaces as required.

PART 2 PRODUCTS

2.1 MANUFACTURERS:
- A. Steelcraft (specified).
- B. Mesker,
- C. Republic
- D. Ceco
- E. Curries
- F. Dittco

2.2 MATERIALS:
- A. Steel Sheet:
  - 1. Doors: 18 gage cold rolled, stretcher leveled; free of scale, pitting or other surface defects.
  - 2. Frames: 14 gage (exterior) and 16 gage (interior), hot rolled, pickled and oiled, or cold rolled as specified above.
- B. Hollow Core: Continuously reinforced with a full core of resin-impregnated kraft fiber honeycomb with 1" nested, hexagonal-shaped cells. Bond core to inside of both face sheets.
- C. Primer: Manufacturer's standard rust inhibitive primer; do not paint testing agency labels.
- D. Anchors, Fasteners, Accessories: Manufacturer's standard, hot-dip galvanized at exterior.
- E. Channel Fillers: Flush steel channel fillers for top channel of exterior doors.

2.3 FABRICATION

A. General:

1. Fabricate steel doors and frames rigid, neat in appearance and free from defects, warp, or buckle. Provide clean cut, straight and true molded members, well formed and aligned miters, dressed and ground smooth, and where applicable, concealed fasteners. Reinforce at corners as required to prevent sagging. Accurately form metal to required sizes and profiles, including astragals.
2. Fit, assemble, and weld units at factory or shop.

B. Doors: Seamless construction (no visible seams on face or vertical edge), of sizes and designs as indicated.

1. Vision Panels: Provide glazing stops/moldings for glazed panels. Glass and glazing is specified in Section 08800.
2. Astragals: Provide standard Z or T astragal for pairs of exterior and fire-rated doors.

C. Frames: Combination stop and frame channel section, rabbeted for doors, of types and styles indicated.

1. Anchors/Fasteners: Supply the proper fastenings and/or anchors to secure frames in each type of structural framing indicated.
2. Silencers/Mutes: Drill stops to receive a minimum of 3 silencers on strike jamb.

2.4 HARDWARE

A. Preparation: Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping, in accordance with final Finish Hardware Schedule and templates provided by the hardware supplier. Reinforce hollow metal units to receive surface-applied hardware. Drilling and tapping for surface-applied hardware will be done on the job site.

B. Location of Hardware: Locate finish hardware as indicated in final shop drawings and/or in compliance with Door and Hardware Institute publication "Recommended Location for Builder's Hardware".

2.5 GLAZING STOPS (BEADS), METAL FRAMED GLASS: Provide manufacturer's standard steel channel or tubular stops, predrilled for screws and factory finished as specified for doors and frames. Glass and glazing is specified in Section 08800.

2.6 FINISH: Dress tool marks and surface imperfections to smooth surfaces and remove irregularities. Chemically treat and clean doors and frames. Apply manufacturer's standard baked-on rust inhibitive primer.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install hollow metal units and accessories in compliance with final shop drawings, manufacturer's instructions, and as specified below.

B. Set frames accurately in position, plumb and aligned, and securely anchor to adjacent construction.

C. Erect fire doors and frames in compliance with NFPA 80.

D. Clearances: Provide clearances of not more than 1/8" at jambs and heads and not more than 3/4" from floor or 3/16" from thresholds. Provide doors with sufficient clearance at bottom to clear the floor finish and swing open freely.

E. Hardware: Install hardware, adjust as required to provide smooth and proper operation with secure latching or locking.

3.2 PRIME COAT TOUCH-UP: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up with compatible air-drying primer.

END OF SECTION

SECTION 08210

WOOD DOORS

PART 1 GENERAL

1.1 SCOPE:
- A. Provide wood doors, complete.
- B. Types of doors required are solid core flush wood doors with wood veneer faces.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:
- A. Finishing; Section 09900.
- B. Door Hardware; Section 08705.

1.3 SUBMITTALS: Comply with Section 01300
- A. Product Data: Submit door manufacturer's product data for each type of door, including details of core and edge construction.
- B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, and other pertinent data.
- C. Warranty: Submit executed warranty.

1.4 QUALITY ASSURANCE
- A. Quality Standards: Comply with the following standards:
  1. National Wood Window and Door Association (NWWDA) I.S.1 "Industry Standard for Wood Flush Doors".
  2. Architectural Woodwork Institute (AWI) "Architectural Woodwork Quality Standards", including Section 1300 "Architectural Flush Doors" for grade of door, core construction, finish and other requirements exceeding those of NWWDA quality standard.
- B. Fire-Rated Doors: Provide doors which comply with the requirements of ASTM E 152 and which are labeled and listed for ratings indicated by U.L., Warnock-Hersey, or other testing and inspection agency acceptable to authorities having jurisdiction.
- C. Manufacturer: Obtain doors from a single manufacturer.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as with manufacturer's instructions.
- B. Identify each door with numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.

1.6 WARRANTY:
- A/ Submit written agreement on door manufacturer's standard form, signed by manufacturer, installer, and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced standards. Warranty shall be in effect for lifetime of installation for solid core interior doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Marshfield, Algoma, Eggers, or Buell.

2.2 INTERIOR FLUSH WOOD DOORS: Provide all wood doors with wood stain color of owners/architects choice and transparent finish unless specified otherwise. Stain and finish top edges of doors where they will be exposed to view from spaces above, otherwise seal top and bottom edges with transparent finish.
- A. Solid Core Doors For Transparent Finish:
  1. Faces: Plain sliced red oak. 1/32" min. veneer.
  2. AWI Grade: Premium, with vertical edge of same species as face veneer.
  3. Construction: PC-5 (particleboard core, 5-ply), or SLC-5 (glued block core, 5-ply), at contractor's

option.

B. Fire-Rated Solid Core Doors:
   1. Faces and AWI Grade: Match non-rated doors.
   2. Construction: Manufacturer's standard core construction to provide fire resistance rating indicated.
   3. Edge Construction: Provide manufacturer's standard laminated edge construction for improved screw-holding capability and split resistance as compared to edges composed of single layer of treated lumber.

2.3 ACCESSORIES:
   A. Light Opening
      1. Manufacturer's standard overlap solid stock wood molding, in species to match face veneer.
         a. Pre-cut to fit opening indicated.

2.4 FABRICATION: Fabricate flush wood doors to produce doors complying with the following requirements:
   A. In sizes indicated pre-machined to accept hardware specified.
   B. Metal Astragals: Pre-machine astragals and formed steel edges for hardware where required for pairs of fire-rated doors.
   C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kinds of doors required.
      1. Light Openings: Trim openings with moldings of material and profile specified.
   D. Provide doors and light opening trim pre-finished by the factory.
      1. Stain color and type of finish from manufacturer’s standard selections as selected by the Owner

PART 3 EXECUTION

3.1 EXAMINATION: Examine doors and door frames prior to hanging to:
   A. Verify that frames comply with indicated requirements for type, size, and location, and swing characteristics, and, that frames have been installed with plumb jambs and level heads.
   B. Verify that doors are free of defects that could cause their rejection.

3.2 INSTALLATION: Install wood doors to comply with manufacturer's instructions referenced AWI standards, NFPA 80 for fire-rated doors, and as specified.
   A. Condition doors to average prevailing humidity in installation area prior to hanging.
   B. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacture or permitted with fire rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
      1. Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold. Cut bottoms of interior doors as directed by the Architect to accommodate clearances required for required floor finish conditions.
      2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
      3. Bevel non-rated doors 1/8" in 2" at lock and hinge edge.
      4. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.
   C. Hardware: For installation refer to Section 08705.

3.3 ADJUSTING AND PROTECTION
   A. Re-hang or replace doors which do not swing or operate freely, as directed by Architect.
   B. Take protective measures to assure that wood doors will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08360 - OVERHEAD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General & Supplementary Conditions, & Division 1

B. Electric overhead sectional door of steel panels of embossed stile and rail design.

1.2 SUBMITTALS

A. Product Data: Provide data on door, track, hinge and roller, and electric operating device.

B. Operating and Maintenance Instructions: Include data for motor and transmission, shaft and gearing, lubrication frequency, control adjustments, spare part sources.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Manufacturers: equal

1. DoorLink: Model 6500, insulated Steel doors
2. Overhead Door Corporation, Series: 426 Series Insulated Steel Doors
3. Raynor, Series: Commercial Decade II, insulated door.
4. Amarr Garage doors Series: model 1000, heavy duty 2" insulated steel doors

B. Panels: 2” thick, manufactured using exterior roll formed stucco embossed 24 ga. nominal steel with 4 minor ribs and continuous polystyrene board pressure bonded between the exterior and steel and flush stucco embossed interior 26 ga. Steel. Sections will have a tongue and groove meeting rail to provide a weather tight seal between sections. End stiles will be 20 ga. Formed steel. Center stiles will be vertical interior 20 ga. Steel plates running the entire sections height and placed on centers for hinge design requirements. Stiles are formed, fastened and bonded as integral structures of the section.

C. Insulation: Door sections to have an R-10 insulation value. with 26 ga. steel back cover.

D. Track: 13 gage, 2" or 3’ wide rolled galvanized steel track, galvanized steel mounting brackets.

1. Tracks to provide vertical lift as far as building height will allow, with partial horizontal at top.

E. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel with each roller having (10) ¼” steel balls per roller.

F. Springs shall be oil tempered, helical wound and stress relieved torsion type. Spring will be 25 thousand cycles, mounted on a continuous cross header steel shaft supported by bearing brackets. Cables are 7x19 strand galvanized aircraft type with a minimum safety factor of 8 to 1.

F. Lock: Inside mounted, adjustable keeper, spring activated latch bar with feature to keep in locked or retracted position; interior and exterior handle; lock.

G. Door Panel Weather-stripping: Fitted to bottom of door panel, full length.

H. Jamb Weather-stripping: Formed metal retainer fitted full height of jamb with integral resilient weather-stripping in moderate contact with door panels.

I. Electric Operator: Furnished by door manufacturer, Commercial Grade, minimum 1/2 HP U.L. listed motor, automatic safety reverse, courtesy light with delayed automatic shut-off & safety controls.

J. Control Station: Standard one button open-close-stop type, separate control for each electric operator; surface mounted.

K. Separate Control station at Service counter that will control (9) doors from one location. See electrical plan E101 for location.

L. Full section glazing per plan. A/601

2.2 FINISHES

A. 1.0 mil paint system with .25 mil rust inhibiting primer and .75 mil top coat that resists fading and chalking.

1. Color to be white.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify wall openings are ready to receive work & opening dimensions & tolerances are within limits.

B. Prepare door opening components to permit installation of door unit and preserve continuity of wall air and vapor barrier seal.

3.2 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Anchor components securely to wall construction and building framing without distortion or stress. Secure tracks to structural members only.

C. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.

D. Coordinate installation of electrical service. Complete wiring from disconnect to unit components.

E. Coordinate installation of sealants & backing materials at frame perimeter as specified in Section 07900.

END OF SECTION

SECTION 08410

ALUMINUM ENTRANCES, STOREFRONTS AND STOREFRONTS

PART 1 - GENERAL

1.1 SCOPE:
- A. Provide aluminum swinging doors and hardware
- B. Aluminum storefront framing,
- C. Aluminum fixed windows

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Glass and glazing requirements: Section 08800.
- B. Lock cylinders: Section 08705.

1.3 QUALITY ASSURANCE:
- A. Fabricate exterior door and frame units to withstand the wind pressure loading value shown or, if not shown, then as per applicable local building code (but not less than 20 lbs. per sq. ft.) acting on the gross area of the frames, doors, panels, and glass, inward as well as outward.

1.4 SUBMITTALS: Comply with Section 01300
- A. Shop Drawings: Submit shop drawings for the fabrication and installation of aluminum doors, framing and associated components. Include wall elevations at 1/2 scale, and half size detail sections of every typical composite member. Show anchors, joint system, expansion provisions, glazing and sealing details, and hardware.
- B. Warranty: Submit a warranty signed by the manufacturer, contractor, installer, agreeing to replace aluminum doors, framing and glazing which fail in materials and workmanship within 2 years of the date of acceptance. Failure of materials or workmanship shall include, but not be limited to, failures in operation of doors and hardware, excessive leakage of air infiltration, excess deflections, de-lamination of panels, deterioration of finish or metal in excess of normal weathering, and defects in accessories, weather-stripping, and other components of the work.

PART 2 - PRODUCTS

2.1 SWINGING GLASS DOORS
- A. Type: Single acting (or double acting where indicated on drawings), sizes as indicated, complete with all hardware.. Kawneer Series 190 or approved equal product as manufactured by Vistawall or Efco.
- B. Pull: Style "T" offset pull handle.
- C. Closer: Manufacturers surface closer with back check and adjustable hold open.
- D. Pivots: Manufacturer's standard, top and bottom offset pivots.
- E. Locks: Manufacturers standard deadlock.
- F. Threshold: Manufacturer's standard with anchors and clips, coordinated with offset pivots and closer. Maximum 1/2" height.
- G. Weather-stripping: Manufacturers standard weather-stripping
- H. Exit Device: Manufacturer’s standard device.
- I. Glazing; 1” insulated units of 1/4" thick float, meeting requirements specified in Section 08800.

2.2 FRAMING:
- A. Framing: Standard shapes and moldings of TriFab II 451T, 2" X 4-1/2" thermal break frame system.

2.3 FINISH: Anodized aluminum for all exposed surfaces in color as shown on drawings or as directed by Architect.

2.4 OTHER MATERIALS:
- A. Provide all other materials, not specifically described but required for a complete, weather tight, and proper installation of doors and framing systems, subject to acceptance by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in compliance with manufacturer's specifications, recommendations and final shop drawings.

B. Set units plumb, level and true to line, without warp or rack of framing and doors. Anchor securely in place. Secure to structure with non-staining, non-corrosive shims, anchors, fasteners, spacers, and fillers. Use care in erection so as not to mar, abrade, or stain finished surfaces. Where aluminum is to be placed in contact with steel, concrete and other dissimilar surface, back paint the aluminum before erection with an acceptable bituminous paint.

C. Seal frames with an approved sealant in color to match frames, making a neat fully weatherproof job. Refer to Section 07900, and comply with requirements in that section.

D. Protection: After erection, adequately protect exposed parts of work from abrasion, staining or any other damage.

E. Cleaning: After completion of other work in the vicinity of aluminum doors and framing, thoroughly clean finished surfaces as recommended by manufacturer.

END OF SECTION

SECTION 08710

FINISH HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY:

A. Extent of finish hardware required is indicated on drawings and in the schedule.

B. Types of finish hardware that may be required include but may not be limited to the following:

1. Hinges
2. Lock cylinders and keys
3. Lock and latch sets
4. Bolts
5. Exit devices
6. Push/pull units
7. Closers
8. Miscellaneous door control devices
9. Protection plates
10. Weather-stripping for exterior doors
11. Astragals or meeting seals on pairs of doors
12. Thresholds
13. Security Products
14. Pivots
15. Electromagnetic Hold-Opens
16. Sound stripping for interior doors
17. Overhead Holders

C. Hardware for aluminum storefront entrance doors are specified with entrance doors in Section 08410 "Aluminum Entrances and Storefronts", except as specifically noted herein.

D. Silencers included integral with hollow metal frames are specified with door frames in Section 08110 "Metal Doors and Frames", except as specified herein.

E. Doors and Frames are specified in Section 08110 "Metal Doors and Frames".

F. Storefront Entrance Doors are specified in Section 08410 "Aluminum Entrances and Storefronts".

G. Security System, Card readers and accessories are specified in Division 16.

1.3 DEFINITION:

A. "Finish Hardware" includes items known commercially as finish hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

1.4 QUALITY ASSURANCE:

A. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: A recognized architectural finish hardware supplier with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced accredited architectural hardware consultant, A.H.C., who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements to Owner's Representative, and Contractor and who will supervise the work of this project.

C. Fire Rated Openings: Provide hardware for fire-rated openings in compliance with National Fire Protection Association (NFPA) Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by Underwriters' Laboratories, Inc. (UL) or Factory Mutual Systems, Factory Mutual Engineering Corporation (FM) for types and sizes of doors required and complies with requirements of door and door frame labels.

D. Coordinate with suppliers and installers of related work, including but not limited to "Standard Steel Doors and Frames", "Aluminum Entrances Storefronts and Windows" and "Metal Fabrications", to insure that all required items are being provided and are compatible with the related products.

E. Coordinate finish hardware with building security system to insure proper installation and operation of door, hardware and security system.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 "Project Meetings." The meeting shall be attended by:
   1. Contractor's representative.
   2. Hardware installer foreman assigned to this job (no substitute attendees permitted).
   3. Hardware suppliers representative
   4. Owner's Representative and Keying Consultant
   5. Hardware manufacturers representative.
   6. Security Consultant & Contractor

1.5 SUBMITTALS:

A. General: Coordinate and submit hardware submittal with submittals required for Metal Doors and Frames" specified in Section 08110 "Standard Steel Doors and Frames" and Section 08211 “Flush Wood Doors”. These submittals shall be submitted concurrently. If one or more of the submittals is not submitted, the other submittals will not be reviewed until the missing submittal(s) are submitted. No additional costs for delay of fabrication and shipping or installation will be allowed for delays due to incomplete or non-concurrent submittals.

B. Product Data: Submit manufacturers technical product data for each item of hardware in accordance with Conditions of Contract and Division 1 "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finishes.

C. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
   1. Type, style, function, size and finish of each hardware item.
   2. Name and manufacturer of each item.
   3. Fastenings and other pertinent information.
   4. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
   5. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
   6. Mounting locations for hardware.
   7. Door and frame sizes and materials.

D. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's Representative's final instructions on keying of locks has been fulfilled.

E. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, sample of each type of finish and any other information essential to the coordinated review of hardware schedule.

F. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.6 PRODUCT HANDLING:

A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set and door number to match set and door numbers of approved hardware schedule. Two or more identical sets may be packaged in same container.

C. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that the count is correct.

D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

1.7 WARRANTY

A. The contractor shall furnish to the Owner the following additional warranties for material and labor:
   1. Closers: Twenty five years for floor closers and surface closers Ten years for overhead concealed closers
   2. Exit Devices: Three years
   3. All other hardware: Two years

PART 2 PRODUCTS

2.1 SCHEDULED HARDWARE:

A. The schedule of hardware is intended to cover all doors in the project and establish a type and standard of quality, but it is the responsibility of the *Supplier/Contractor* to furnish the proper hardware and related pieces for all openings, whether specified or not. Any presumed omissions or additional pieces in the hardware groups shall be coordinated and clarified prior to bid date and shall be called to the attention of the Owner's Representative in the submitted hardware list/schedule.

B. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in this section and in the Hardware Schedule at the end of this specification section. Products are identified by using one or more manufacturers for each hardware type required. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements or an approved equal.

C. Manufacturers: As listed below or approved equal

1.	Door Butts	PBB, Inc., Stanley or equal
2.	Locksets/Latch sets	Best 73 Series Non I/C or equal
3.	Closers	Norton 1600, Stanley 1650 or equal
4.	Stops	Door Control International or equal
5.	Overhead Holder Opens	Dorma or equal
6.	Kick plates & Pulls	Rockwood or equal
7.	Door Bottoms, Thresholds and/or Weather-stripping & Seals	Reese*, Pemko,
8.	Meeting Stiles & Astragals	Reese*,Pemko,
9.	Exit Devices	Precision, Detex or equal
10.	Flush Bolts Pivots	Door Control International, Rockwood or equal Dorma or equal
11.	Door Silencers/Mute	Provide with metal frame

2.2 MATERIALS AND FABRICATION:

A. General:
   1. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
   2. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Owner's Representative.
   3. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable American National Standards Institute (ANSI) Al56 series standard for each type hardware item and with ANSI Al56.l8 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

D. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

E. Provide concealed fasteners for hardware units which are exposed when door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

F. Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 HINGES, BUTTS AND PIVOTS:

A. Templates: Provide only template-produced units.

B. Screws: Furnish Phillips flat-head or machine screws for installation of units. Finish screw heads to match surface of hinges or pivots.

C. Unless otherwise noted or specified, the size of the butts will be determined by the following table:

1. Hinge Height:
2. Doors 1-3/4" thick and up to 36" wide, 4-1/2"
3. Doors 1-3/4" thick and 37" to 48" wide, 5"
4. Hinge Width: Provide widths sufficient to clear trim projection when door swings 180 degrees.

D. Provide ball-bearing hinges for all doors.

E. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1.	Steel Hinges:	Steel pins.
2.	Non-ferrous Hinges:	Stainless steel pins.
3.	Exterior Doors:	Non-removable pins
4.	Interior Doors:	Non-rising pins.
5.	Tips:	Flat button and matching plug, finished to match leaves.
6.	Number of hinges:	Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.

2.4 LOCKSETS AND LATCHSETS:

A. Uniformity: Except where otherwise specified, all locksets, padlocks, cylinders and component parts, as specified hereinafter, shall be by the same lever design, where applicable. Design to be Best 7KC, #15D Non I/C.

B. Levers: When installed, 1/8" play off horizontal is maximum acceptable for levers.

C. Verify whether standard or ANSI cutouts are provided in metal frames.

D. Strikes: All lock strikes shall be boxed and shall have a curved lip of sufficient length to protect the trim and jamb.

2.5 LOCK CYLINDERS AND KEYING:

A. General: Supplier will meet with Owner's Representative to finalize keying requirements and obtain final instructions in writing.

1. Provide construction cylinders for all new exterior locks to be used during construction.
   a) Provide 4 keys for each lock.
2. Construction cylinders to be replaced per keying schedule at project completion by hardware supplier.

B. Review the keying system with the Owner and provide the type required.

C. Permanent Cylinders (Standard cylinder items): Cylinders to be Schlage Cylinders per Owner's standards. All locks and cylinders shall be keyed at the factory of the lock manufacturer where permanent records are maintained. All to be master keyed and grandmaster keyed, on new set and further keyed alike or keyed differently, as directed by Owner. All cylinders to be furnished with split key construction master key feature. Hardware Supplier shall provide Contractor with (10) twenty construction keys for use during construction period. It shall be the responsibility of Hardware Supplier to supervise the Contractor while the Contractor is converting the locks to permanent cylinders. Owner's Representative is to be present during the entire conversion. Notify the Owner's Representative at least 48 hours before cylinder installation so that Owner's Representative can take possession of the keys following permanent cylinder conversion.

D. Quantities of all Keys shall be as follows:
1. Each cylinder keyed differently.....3 keys
2. Each keyed alike group.....6 keys
3. Each master keyed set.....3 keys
4. Grandmaster key.....3 keys
5. Blank keys of each keyway used.....10 keys
6. Extractor keys.....2 keys

E. Keying Schedule: Upon receipt of the approved Hardware Schedule, the Contractor shall arrange a keying meeting between the hardware supplier, and the Owner's Representative. A detailed keying schedule shall be submitted in triplicate for final approval by the Owner's Representative prior to ordering of locks and cylinders and prior to the rough-in of security items. Indicating clearly how the Owner's final instruction on keying of locks has been fulfilled.

F. Special Keying:
1. All locks and cylinders to be construction master keyed.
2. Stamp all keys with key symbol for visual key control.
3. Permanently inscribe each key with the notation "DO NOT DUPLICATE".

G. Key Delivery:
1. Hand deliver sets of change keys in suitable individual envelopes tagged and plainly marked with the change number or symbol, door designation and all other identifying information as required. Assemble change key envelopes into one package and coordinate Owner-supervised change out and hand delivery to the Owner.
2. Hand deliver (after Owner-supervised change out) master keys, and grand master keys as directed by the Owner's Representative.

H. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.

I. Key Material: Provide keys of nickel silver only.

J. Exit Device Dogging: Except on fire-rated doors, wherever doors are equipped with exit devices, equip the units with keyed dogging device to hold the push bar down and the latch bolt in open position.

K. Provide new cylinders for all locking storefront doors as part of keying schedule and construction key replacement procedure.

2.6 DOOR CLOSERS:

A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

B. Where parallel arms for closers are indicated or required, provide closer unit one size larger than recommended for use with standard arms. Coordinate location of visible side with Architect, prior to submittal and ordering.

C. Supply drop plates at narrow top rail doors and parallel-arm closers at reverse bevel doors and where doors swing a full 180 degrees.

D. Where recessed or concealed closers are specified or detailed, coordinate installation with other related trades to insure proper preparation and sequencing of work occurs. Provide all necessary accessories for concealed or recessed installation even if not specifically listed.

E. Detector closers shall have a swing-free arm that allows free use of the door under regular use, but upon activation of fire alarm arm, will automatically close the door.

F. Where closers have painted finish, provide factory applied painted finish to match hardware finish as closely as possible.

G. Closers Pull Effort:
1. Interior: 5 pounds maximum.
2. Exterior: 8.5 pounds maximum.

3. Rated Doors: 15 pounds maximum.

H. Thresholds: Furnish all thresholds as detailed and as specified. In the event of a contradiction between details and the specifications, request clarification during bidding.

2.7 HARDWARE FINISHES:

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.
   1. In general, match items to the manufacturer's standard finish for the latch and lock set ("Satin Chrome", US26D) for color and texture except where specifically noted otherwise.
   2. Exterior butts and kick plates only, are to be dull stainless steel, US32D.
   3. Furnish surface mounted door closers with 689 finish.

B. The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.

PART 3 EXECUTION

3.1 INSTALLATION:

Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Owner's Representative.

A. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

B. Where modifications to the specified hardware are required by reasons of construction characteristics, the Contractor shall provide and install hardware with the specified operational functional features in the quality and finish specified. The sizes of such hardware shall be adequate for the service to which the item will be subjected in the course of normal use.

C. Items of hardware which are not definitely specified herein, but are necessary for completion of the work, shall be provided and installed at no additional cost to the Owner.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

G. Special care must be taken where weather-stripping and sound stripping are required to provide a tight and thorough installation with a continuous seal. No gaps will be permitted in stripping material.

3.2 ADJUST AND CLEAN:

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment. Insure all adjustments and operation meet California Building Code (CBC), Title 24, Americans with Disabilities Act (A.D.A.) and all other Accessibility/Handicapped/Disabled Persons standards, codes and requirements.

D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

E. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty product design, materials or installation of hardware units.

3.3 SCHEDULE OF HARDWARE SETS:

A. Should it be determined that the hardware as specified in certain locations, due to detail or size of members to which the hardware is applied, is unsuitable, provide in lieu thereof hardware of proper type; such hardware shall be similar in operation and equivalent to the type specified and shall be provided at no additional cost to the Owner.

B. Should items of hardware not definitely specified be needed for completion of the work, provide such items of type and quality suitable for the service required and comparable to adjacent hardware as herein specified at no additional cost to the Owner.

C. If discrepancies exist, or if hardware is not completely specified for any opening, request clarification from the Owner's Representative prior to bid.

END OF SECTION 08710

SECTION 08800

GLASS AND GLAZING

PART 1 - GENERAL

1.1 SCOPE:
- A. Provide glass and glazing, complete.
- B. Mirrors

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Metal Doors; Section 08110
- B. Wood Doors; Section 08210
- C. Aluminum Entrances and Storefronts; Section 08410

1.3 QUALITY ASSURANCE:
- A. Provide safety glass with etched or ceramic fired permanent identification visible on glass when glazed. B. Label each piece of glass indicating compliance with requirements. Do not remove labels prior to installation.
- C. Provide 10 year seal warranty for insulated glazing.

1.4 SUBMITTALS:
- A. Comply with Section 01300.
- B. Product Data: Submit copy of manufacturer's specifications and installation instructions for each type of glass and glazing material.
- C. Include test data or certification substantiating that glass complies with specified requirements.

1.5 PROTECTION:
- A. Protect glass surfaces and edges at all times during the construction period.
- B. Keep glass free from contact or contamination by materials capable of staining glass.

PART 2 - PRODUCTS

2.1 GLASS:
- A. ASTM C 1036, of the types, classes, and forms specified. See drawings and Door and Window Schedules for locations.
  1. Float glass: Type I, Class 1 (transparent), Quality q3 (glazing select); 1/4" thick, unless otherwise specified.
  2. Tinted Glass: Type I, Class 3 (light reducing), Quality q3 (glazing select); as shown on the plans.
  3. Tempered glass: Provide safety glass (tempered) complying with requirements of ANSI Z97.1 and CPSC 26 CFR 1201 CII, heat-strengthened (after cutting to final size) to 4 times normal strength, by process designed to eliminate tong marks or by vertical process if glass is installed to conceal tong marks.
  4. Insulated glazing shall be double 1/4" thick glass with 1/2" air space (1" total thickness), tempered and tinted where shown on plans.
  5.. Mirrored glass with sanded edges, 1/4” thick.

2.2 GLAZING MATERIALS:
- A. Provide materials with proven record of compatibility with surfaces contacted in installation.
  1. Glazing Sealants: Tremco "Roglaze", Pecora "836", or Sonneborn "Omniglaze".
  2. Glazing Gaskets: Structural rubber, molded neoprene, or cellular neoprene as recommended by manufacturer of glazing system.
  3. Glazing Tape: Dapp "Butyl Rubber Tape" or Tremco "440".
  4. Setting Blocks: Neoprene or other resilient blocks of 70 to 90 Shore A durometer hardness, adhesively backed on one face only, tested for compatibility with specified glazing sealants.
  5. Provide CRL-EZ hangers for mirrors.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Comply with recommendations of glass manufacturer and manufacturers of sealants and other glazing materials, unless otherwise indicated or specified, including preparation of surfaces.

1. Clean channel surfaces and prime as recommended by sealant manufacturer.
2. Cut glass to size as required for measured opening, provide adequate edge clearance and glass bite all around. Cut prior to tempering.
3. Do not install sheets which have edge damage or face imperfections.
4. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during the construction period.
5. Install mirrors in sizes and locations shown on the plans.

3.2 CURING:

A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.

END OF SECTION

DIVISION 9 FINISHES

SECTION 09255

GYPSUM WALLBOARD

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY:

A. Extent of each type of gypsum drywall construction required is indicated on Drawings. This section includes the following types of gypsum board construction:
   1. Gypsum board to be screw-attached to steel framing and furring members.
   2. Installation of gypsum board trims, angles , and accessories.
   3. Gypsum board finishing (joint tape-and-compound treatment).

B. Related Sections:
   1. Metal Framing and Support Systems including "C" shaped steel joists for structural framing are specified in Section 09100.
   2. Shaft Wall Construction is specified in Section 09263.
   3. Thermal and Acoustic Insulation is specified in Section 07210.
   4. Painting is specified in Section 09900.
   5. Glass fiber reinforced gypsum units are specified in Section 09290.
   6. Wood Framing is specified in Section 06100 "Rough Carpentry".

1.3 DEFINITIONS:

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

1.4 SUBMITTALS:

A. Field Mock Up of Each Level of Finishing: Provide a field mock up of each level of finishing for the review of the Architect, prior to start of finishing in any areas. Samples, if acceptable, may be incorporated into final work.

1.5 QUALITY ASSURANCE:

A. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

B. Single-Source Responsibility: Obtain each type of gypsum board and related joint treatment from a single manufacturer.

C. Substrate: Where in-place materials are substrate for other trade, and in their examination of the substrate and surface, they find unacceptable items or conditions, these items or conditions shall be repaired or replaced at no additional cost to the Owner.

D. Damage: Damaged materials or materials with imperfections, or areas which have unacceptable levels of finish, shall be repaired. Determination of imperfections or unacceptable levels of finish shall be by the Architects sole judgement. Damaged and rejected areas shall be repaired. If repair is visible in completed work, then area shall be replaced from corner to corner or breakpoint. Repair or replacement work shall be performed at no additional cost to the Owner.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS:

A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.

B. Minimum Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.

C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials form drying too rapidly.

PART 2 PRODUCTS

2.1 MANUFACTURER:

A. Subject to compliance with requirements, provide products of one of the following:

1. Gypsum Boards and Related Products:
   a. U.S. Gypsum Co.
   b. National Gypsum Co.
   c. Approved equal.

2.1 GYPSUM BOARD:

A. General:

1. Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.
2. Thickness: Provide gypsum board in 5/8" thickness to comply with ASTM C 840 for application system and support spacing indicated.

B. Gypsum Wallboard: ASTM C 36, and as follows:

1. Type: Regular unless otherwise indicated.
2. Edges: Tapered.

C. Gypsum Wallboard for Fire Rated Assemblies: ASTM C 36, and as follows:

1. Type: Type X.
2. Edges: Tapered.

D. Gypsum Board for Multi-Layer Applications: Gypsum wallboard, ASTM C 36, and as follows:

1. Type: Type X
2. Edges: Tapered

E. Moisture-Resistant or Water-Resistant Gypsum Backing Board: ASTM C 630, and as follows:

1. Type: Regular/Type X at Fire Rated Assemblies
2. Edges: Tapered

F. Exterior Gypsum Sheathing: ASTM C 1177 as follows:

1. Type: Regular ("Dens-Glas Gold")/Type X ("Dens-Glas Gold Firestop") for fire rated assemblies.
2. Edges: Manufacturers standard
3. Faces: Alkali-Resistant/Fiberglass Matts front and back.
4. Core: Silicone-Treated Core

2.2 TRIM ACCESSORIES:

A. General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for screwing, nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads, and one-piece control joint beads at all exposed terminations, corners and other similar conditions.

B. Cornerbead and Edge Trim for Interior Installation: Comply with ASTM C 840 and C1047.

C. Provide other moldings and trim in sizes and configurations as indicated on the drawings.

2.3 JOINT TREATMENT MATERIALS:

A. General: Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.

B. Joint Tape: Paper reinforcing tape.

C. Joint Compound: On interior work provide setting-type for bedding and filling, ready-mixed drying-type all purpose or topping compound for topping.

D. Water-Resistant Joint Compound: On exterior work and work with moisture-resistant and water-resistant gypsum wall board, provide special water-resistant type for treatment of joints, fastener heads and cut edges of moisture-resistant and water-resistant gypsum wallboard.

2.4 MISCELLANEOUS MATERIALS:

A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.

B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum boards.

C. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.

D. Fastening Adhesive: Special adhesive recommended in compliance with ASTM C 557 for laminating gypsum boards to steel framing.

E. Gypsum Board Screws: ASTM C 1002.

F. Concealed Acoustical Sealant: Non-drying, non-hardening, nonskinning, nonstaining, nonbleeding, and gunnable sealant complying with the requirements specified in Section 07901 "Joint Sealants".

G. Primer: Of type recommended by manufacturer for finishing.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Examine substrates to which drywall construction attaches or abuts including but not limited to, insulated or uninsulated metal or wood framing, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Notify Owner's Representative of unsatisfactory conditions. Do not begin work until deficient substrate areas have been corrected.

C. Proceeding with the work described in this Section implies installer's acceptance of the substrate conditions. Any problems related to the substrate shall be repaired to the satisfaction of the Owner's Representative without any additional cost to the Owner.

3.2 PREPARATION:

A. Furnish necessary materials, clips, anchors and devices to other trades for installation well in advance of time needed for coordination with other construction.

3.3 APPLICATION OF GYPSUM BOARD, GENERAL:

A. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840 and G.A. 216.

B. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.

C. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.

D. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.

E. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.

F. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

G. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

H. Spot grout hollow steel door frames. Apply spot grout at each jamb anchor clip just before inserting board into frame.

I. Form control joints and expansion joints at location indicated, with space between edges of boards, prepared to receive trim accessories.

J. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to ½ inch space and trim edge and seal joints with acoustical sealant, where exposed. Seal with fire sealant at fire rated walls.

K. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.4 METHODS OF GYPSUM BOARD APPLICATION:

A. Single-Layer Application: Install gypsum wallboard as follows:
   1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
   2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

B. Double-Layer Application: Install base and face layer of gypsum wallboard.
   1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
   2. On partitions/walls, apply base layer and face layers vertically (parallel to framing) with joints of base layer over supports and face layer joints offset at least 10 inches with base layer joints.

C. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
   1. Ceilings and suspended gypsum board locations: Fasten with screws.
   2. Walls/Partitions of metal framing construction: Fasten with screws.

D. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
   1. Fasten base layers with screws.
   2. Fasten face layer with adhesive and screws.

E. Exterior Gypsum Sheathing: Apply board perpendicular to supports, with end joints staggered over supports. Fasten with screws recommended by the sheathing manufacturer. Install with "gold" side out.

F. Wall Tile Base: Where drywall is base for thin-set ceramic tile and similar rigid applied wall finishes, install Water-Resistant Gypsum Board to comply with the requirements of ASTM C 840 and the manufacturer's recommendations.

G. Special Conditions: At all toilet rooms, at walls behind janitor's sinks, and at other "wet" and "moist" locations, install Water-Resistant Gypsum Board to comply with the requirements of ASTM C 840 and the manufacturer's recommendations.

3.5 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Install corner beads at external corners.

C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
   1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
   2. Install "LK" bead where substrate is kerfed to receive long flange of trim.
   3. Install "L" bead where edge trim can only be installed after gypsum board is installed.

3.6 FINISHING OF DRYWALL:

A. General:
   1. Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
   2. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.
   3. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

B. Levels of Finishing:
   1. Finish interior gypsum wallboard by applying the following joint compounds in prefill and coats indicated for each level of finish. Sand between coats and after last coat:
      a) Embedding and First Coat: Setting-Type Joint Compound.
      b) Fill (Second) Coat: Setting-type joint compound.
      c) Third and Skim (Finish) Coat: Ready-mix drying-type all-purpose or topping compound.
   2. Level 1: All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
   3. Level 2: All joints and interior angles shall have tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
   4. Level 3: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all joints, angles, fastener heads and accessories. All joint compound shall be smooth and free of tool marks and ridges.
   5. Level 4: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges.
   6. Level 5: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

C. Finish:
   1. Smooth Finish: Provide smooth finish at all interior painted gypsum board where indicated and/or noted.
      a) Level 5
   2. Textured Finish: Provide light spray textured or knock down finish at all painted gypsum board unless indicated or noted otherwise.
      a) Level 4; Submit samples for selection and approval by Owner and Design/Builder prior to installation of gypsum board.

D. Water-Resistant Backing Board Base for Ceramic Tile: Finish joints between water-resistant backing board with tape and setting-type joint compound to comply with gypsum board manufacturer's recommendations and installation standards referenced in Section 09310 "Tile."

E. Partial Finishing: As noted on the drawings, certain areas may receive only partial finish. Areas which are required to achieve or maintain a fire rating must receive the finish required to achieve the assembly rating.

3.7 FIELD QUALITY CONTROL

A. General: Inspect in-place materials and products for compliance with requirements. Repair or remove and replace unacceptable materials and products as directed by Owner's Representative, at no additional cost to the Owner.

B. Acceptance Tolerances:

   1. In-place materials will not be acceptable if exceeding the following allowable variations from requirements: Finished framing shall be true planes, level within 1/8-inch in ten feet non-accumulative, when tested with a straightedge in any direction and such surfaces shall be without concave or convex irregularities within the noted 10 feet. Greater deviations will not be acceptable and shall be removed and replaced at no additional cost to the Owner.
   2. See Section 09310 "Tile" and Section 09100 “Metal Support Systems” for more restrictive tolerance.

3. Refer to other trades for which in-place materials are substrates. Provide in-place materials to the tolerances required for other trades substrates as specified in other trades sections of these specifications or on the drawings.

C. Substrate: Where in-place materials are substrate for other trade, and in their examination of the substrate and surface, they find unacceptable items or conditions, these items or conditions shall be repaired or replaced at no additional cost to the Owner.

3.8 PROTECTION OF WORK:

A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall work being without damage or deterioration at time of substantial completion.

END OF SECTION 09255

SECTION 09511

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

B. Division 07210 Building Insulation

1.2 SUMMARY:

A. Extent of each type of acoustical ceiling is shown and scheduled on drawings.

B. Types of acoustical ceilings specified in this section include the following:

1. Acoustical panel ceilings, exposed suspension.

C. R-19 Un-faced insulation

1.3 QUALITY ASSURANCE:

A. Coordination of Work: Coordinate layout and installation of acoustical ceiling panels and suspension system components with other work supporting or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components and partition system.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 "Submittals"

B. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling panel and suspension system required.

C. Samples: Submit samples of each type of ceiling tile and ceiling grid/suspension system.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Deliver acoustical ceiling panels to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling panels permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS:

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.7 EXTRA MATERIALS:

A. Deliver extra materials to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Panels: Furnish quantity of full size units equal to 2.0% of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0% of amount installed.

PART 2. PRODUCTS

2.1 ACOUSTICAL PANELS:

A. Manufacturer: An Asterisk (*) after the manufacturers name indicates whose product designations are used for purpose of establishing minimum requirements & detailing on the drawings. Provide either the product designated or the comparable product of one of the other manufacturers listed, which complies with the requirements included in this section. Provide written analysis/ comparison of product being provided with designated product. Subject to compliance with requirements, provide products by one of the following:

1. Armstrong
2. U.S. Gypsum
3. Or Equal

B. Acoustical material shall be Class A

C. Noise Reduction Coefficient, NRC, shall be measured according to American Society of Testing and Materials (ASTM) C 423, "Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method". Materials specified to be tested on mounting E-400 unless otherwise noted (see ASTM procedure E795).

D. Ceiling Sound Transmission Class, STC, shall be measured according to AMA 1-II, "Ceiling Sound Transmission Test by Two-Room Method".

E. Panels:

1. Armstrong "Cortega", Item #770, 24" x 24" x 5/8" straight edge lay-in or equal
   a. NRC Range: .50 - .60.
   b. CAC Range: 35-40
   c. Light Reflectance: 75%-80%
      Flame Spread: 25

2.2 METAL SUSPENSION SYSTEMS:

A. Manufacturer: An Asterisk after the manufacturers name indicates whose product designations are used for purpose of establishing minimum requirements & detailing on the drawings. Provide either the product designated or the comparable product of one of the other manufacturers listed, which complies with the requirements included in this section. Provide written analysis/ comparison of product being provided with designated product. Subject to compliance with requirements, provide products by one of the following:

1. Armstrong
2. Donn
3. Chicago Metallic Corporation
4. Or Equal

B. General: Suspension systems shall be 1 1/2" with 15/16" Tee, heavy duty class standard type, hung directly from structure above.

C. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.

D. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated. Color to be white.

E. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.

F. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, pre-stretched, Class 1 coating, sized so that stress at 3-times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12 gage.

G. Edge Moldings and Trim: Provide manufacturer's standard metal molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated.

H. Hold-Down Clips for Non-Fire-Rated Ceilings: For interior ceilings composed of lay-in panels weighing less than 1 lb. per sq. ft., provide hold-down clips spaced maximum 2'-0" o.c. on all cross tees.

I. Compression Strut/Hold Down: Provide and install compression strut to prevent vertical displacement from an upward force equal to 1 pound per square foot in conformance with the California Building Code (CBC).

2.3 MISCELLANEOUS MATERIALS:

A. Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints, per requirements specified in Section 07901 "Joint Sealants".

B. Provide R-19, 2x4 insulation batts above all ceiling tile.

PART 3 EXECUTION

3.1 PREPARATION:

A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width panels at borders wherever possible, and comply with reflected ceiling plans.

C. Coordinate ceiling system with wall & partitions, ceiling height partitions and partition diagonal bracing & supports. Cut & adjust panels as required to allow installation of wall & partitions.

3.2 INSTALLATION:

A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and CISCA standards applicable to work.

B. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 8" from each end and spaced 4'-0" along each direct-hung main runner, and as otherwise indicated, leveling to tolerance of 1/8" in 12'-0".

1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
2. Secure Splay Wires by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.

C. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical panels. Provide continuous bead of acoustical sealant at back side edge moldings so that sealant is concealed in final installation.

D. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

1. Install hold-down clips in areas where required by governing regulations; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.3 FIELD QUALITY CONTROL

A. The acoustical panel ceiling installation and the in place materials will not be acceptable if any of the following conditions exist. Determination of their acceptability shall be solely based upon the Owner's Representative's judgment.

1. Visible variation in color, pattern, texture or appearance.
2. Panels and ceiling systems which are not installed level and plumb.
3. Blemishes or defects in the material or finish of system components.

B. Any areas or items which are not acceptable to the Owner's Representative shall be repaired at no additional expense to the Owner.

3.4 CLEANING:

A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage to satisfaction of the Owner's Representative, at no cost to the Owner.

END OF SECTION

SECTION 09660

RESILIENT FLOORING

PART 1. GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:
   1. Vinyl composition tile.
   2. Resilient wall base and accessories.

1.3 DEFINITIONS

A. Manufacturer: Provide each type of resilient flooring material, and flooring accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

B. Fire Performance Characteristics: Provide resilient flooring materials with the following fire performance characteristics as determined by testing products per American Society of Testing and Materials (ASTM) test method indicated below by Underwriters Laboratories, Inc. (UL) or another testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Critical Radiant Flux: 0.45 watts per sq. cm or more per American Society of Testing and Materials (ASTM) E 648.
   2. Smoke Density: Less than 450 per American Society of Testing and Materials (ASTM) E 662.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 "Submittals"

B. Samples for Verification Purposes: Submit the following samples of each type, color and pattern of resilient flooring and flooring accessory required, showing full-range of color and pattern variations.
   1. Full-size tile samples.
   2. 12-inch long section of each resilient flooring accessory.

C. Maintenance Instructions: Submit manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

D. Product Data: Submit manufacturer's technical information including application instructions for primers, adhesives, sealants, and leveling compounds for verification of compatibility of flooring materials with moisture vapor emission membrane system.

E. Letter from flooring manufacturer and moisture vapor emission membrane system manufacturer stating that the products are acceptable, compatible and will be warrantied as a complete system.

1.5 PROJECT CONDITIONS

A. Maintain minimum temperature of 70 degrees F (21 degrees C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55 degrees F (13 degrees C) in areas where work is completed. Do not install resilient flooring until they are at the same temperature as the space where they are to be installed.

B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturer's recommended bond and moisture test.

C. Maintain minimum temperature of 65 degrees F (18 degrees C) in spaces to receive vapor emission membrane system for a minimum of 48 hours prior to application. Concrete floors shall be surface dry and free from loose dirt or other contaminating materials including concrete curing compounds.

D. Subfloor Moisture Conditions: Moisture emission rate of not more than 3 lb/1000 sq. ft./24 hours (14.6 kg/1000 sq. m/24 hours) when tested by calcium chloride moisture test in compliance with CRI 104, 6.2.1, with subfloor temperatures not less than 55 deg F (12.7 deg C).

1.6 EXTRA MATERIALS

A. Deliver extra resilient flooring materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

1. Furnish not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.
2. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof of each different type and color of resilient wall base installed.

PART 2. PRODUCTS

2.1 MATERIALS

A. Available Products: Subject to compliance with requirements, provide one of the products specified in each Product Data Sheet at end of this Section.

2.2 RESILIENT FLOORING

A. Vinyl Composition Floor Tile: Products complying with American Society of Testing and Materials (ASTM) F 1066, Composition 1 (nonasbestos formulated), and with requirements specified in Vinyl Composition Floor Tile Product Data Sheet at end of this Section.

2.3 RESILIENT WALL BASE

A. Rubber Wall Base: Products complying with Federal Specification (FS) SS-W-40, Type II, and requirements specified in the Rubber Wall Base Product Data Sheet at end of this Section.

2.4 RESILIENT ACCESSORIES

A. Rubber Accessories: Products complying with requirements specified in Rubber Accessory Product Data Sheet at end of this Section.

2.5 INSTALLATION ACCESSORIES:

A. Concrete Slab Primer: Nonstaining type as recommended by vapor emission membrane system manufacturer and flooring manufacturer.
B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile and vapor emission membrane system manufacturer for applications indicated.
C. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.
D. Rod for heat-welding seams: Product of floor covering manufacturer in color to match field color of special resilient flooring.
E. Reducer Strips: Rubber, tapered edge style in thickness to suit adjacent flooring materials & conditions.
F. Metal Cap Molding/Edge Strips: Extruded aluminum with mill finish of width and height required to protect exposed edge of special resilient flooring and in maximum available lengths to minimize running joints.

2.6 MOISTURE VAPOR EMISSION MEMBRANE SYSTEM

A. If moisture of the concrete flooring exceeds the amount allowed by the flooring manufacturer, provide moisture vapor emission membrane system recommended by the flooring manufacturer that the manufacturer will warranty as part of the overall flooring system.

PART 3. EXECUTION

3.1 INSPECTION

A. General: Examine areas where installation of vapor emission membrane system and resilient flooring materials will occur, with Installer present, to verify that substrates and conditions are satisfactory for resilient flooring installation and comply with tile manufacturer's requirements and those specified in this Section.

B. Concrete Subfloors: Verify that concrete slabs comply with American Society of Testing and Materials (ASTM) F 710 and the following:
   1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with installation of vapor emission membrane system and bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by vapor emission membrane system and resilient flooring manufacturer.
   2. Finishes of subfloors comply with tolerances and other requirements specified in Division 3 "Cast-In-Place Concrete" for slabs receiving resilient flooring.
   3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

C. Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compounds as recommended by vapor emission membrane system and flooring manufacturer. Provide 1 Calcium Chloride test in every 1000 s.f. area or fraction thereof.

D. Do not proceed with installation until unsatisfactory conditions have been corrected. Proceeding with the work signifies that the Contractor accepts the substrate, surfaces & conditions and any problems related to the substrate shall be repaired to the satisfaction of the Owner's Representative without any additional cost to the Owner.

3.2 PREPARATION

A. Prepare subfloor surfaces as follows:
   1. The concrete slab temperature must be between 68 degrees F. +/- 5 degrees F.
   2. Use leveling and patching compounds as recommended by resilient flooring manufacturer and vapor emission membrane system for filling noticeably uneven or out of level floors, small cracks, holes and depressions in subfloors. The concrete subfloor must be flat to a tolerance of 1/8" in ten linear feet.
   3. Grind high, irregular or discontinuous surfaces, and provide cementitious underlayment/fill material at depressions as required to correct unsatisfactory conditions.
   4. Remove coatings from subfloor surfaces that would prevent adhesive or vapor emissions membrane system bond, including curing compounds incompatible with resilient flooring adhesives, paint, oils, waxes and sealers.
   5. Steel troweled (slick) finished concrete floors shall be properly roughened to ensure adhesion.
   6. All concrete subfloors shall be prepared according to American Society of Testing and Materials (ASTM)-F-710-82, preparing concrete floors and other monolithic floors to receive resilient flooring.
   7. All curing, hardening and breaking compounds must be removed.

B. Broom clean or vacuum surfaces to be covered, and inspect subfloor.

C. Concrete subfloors that are porous, gritty, or dusty shall be primed with manufacture's recommended primer.

D. Apply concrete slab primer if recommended by vapor emissions membrane system manufacturer or resilient flooring manufacturer.

E. Bond test: Perform an adhesive bond test as recommended by manufacturer.

F. Calcium Chloride Moisture Test: Perform Calcium Chloride test as recommended by manufacturer.

3.3 INSTALLATION OF VAPOR EMISSION MEMBRANE SYSTEM

A. If required by flooring manufacturer to provide proper concrete slab dryness, adhesion, moisture content and for flooring system warranty, install vapor emission membrane system. Install vapor emission membrane system in strict accordance with manufacturer's installation instructions.

3.4 INSTALLATION, GENERAL

B. Install resilient flooring using method indicated in strict compliance with manufacturer's printed instructions. Extend resilient flooring into toe spaces, door reveals, cabinet recesses (including cabinets with removable fronts) and into closets and similar openings.

C. Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.

D. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.

E. Install resilient flooring on covers for telephone and electrical ducts, and other such items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed in these covers. Tightly cement edges to perimeter of floor around covers and to covers.

F. Tightly cement resilient flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

G. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
   1. Install inside and exterior corners before installing straight pieces.
   2. On irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
   3. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

3.5 INSTALLATION OF TILE FLOORS

A. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid use of cut widths less than ½ tile at room perimeters. Lay tile square to room axis, unless otherwise shown.

B. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped or deformed tile are not acceptable.
   1. Lay tiles in basket weave pattern with grain direction alternating between/reversed in adjacent tiles.

C. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions. Apply no more adhesive than can be covered by resilient flooring material within the manufacturers recommended working time of the adhesive.

D. Where seating and other items are indicated for installing on top of finished tile floor, install tile before these items are installed.

3.6 INSTALLATION OR RESILIENT BASE

A. Apply adhesive per manufacturers recommendations at all locations to receive base. Do not apply more adhesive than can be covered with base material within the working time of the adhesive.

B. Cut base into accurate lengths to minimize the number of joints. Match edges at joints/seams and double cut ends. Install butt joint ends tightly so that joint width is not greater than 1/64.

C. Scribe base accurately at adjacent materials. Press firmly into adhesive and downward so that bottom edge follows floor profile. Do not cause top edge or seam to gap or pull away from the wall.

D. Miter internal corners. Provide premolded exterior corners, or if not available in color to match base, backcut running base. Install preformed end stops at exposed ends of base.

3.7 INSTALLATION OF ACCESSORIES

A. Apply resilient accessories in strict accordance with manufacturer's installation instructions.

B. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

3.8 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing resilient floor coverings:
   1. Remove visible adhesive and other surface blemishes using cleaner recommended by floor covering manufacturers.
   2. Sweep or vacuum floor thoroughly.
   3. Do not wash floor until after period recommended by floor covering manufacturer.
   4. Damp-mop floor to remove black marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by floor covering manufacturer.
   1. Apply protective non-slip floor polish to resilient floor covering surfaces that are free from soil, visible adhesive, and surface blemishes.
      a. Use commercially available, metal, cross-linked acrylic product acceptable to floor covering manufacturer.
      b. Coordinate selection of non-slip floor polish with Owner's maintenance service.

2. Do not move heavy and sharp objects directly over resilient floor coverings. Place plywood or hardboard panels over floor coverings and under objects while they are being moved. Slide or roll objects over panels without moving panels.

C. Clean resilient flooring not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean resilient floor coverings by method recommended by manufacturer.
1. Strip protective non-slip floor polish that was applied after completing installation, prior to cleaning.
2. Reapply new coating of non-slip floor polish after cleaning.

RESILIENT TILE FLOORING PRODUCT DATA SHEET

Vinyl Composition Floor Tile

Designation:	(See Finish Schedule Sheets)
Class:	Class 1 (solid color tile) and Class 2 (through pattern tile), Composition 1, SS-T-312B (1), Type IV, ASTM F-1066-87.
Wearing Surface:	Smooth.
Thickness:	1/8 inch.
Size:	12-by-12 inches.
Color and Pattern:	To be determined

Products:
1. Azrock
2. Armstrong
3. Forbo
4. Mannington
5. Or Equal

RESILIENT WALL BASE PRODUCT DATA SHEET

Rubber Wall Base Designation: (See Finish Schedule Sheets)

Style:	Cove with top-set toe.
Minimum Nominal Thickness:	1/8 inch.
Height:	4 inches.
Lengths:	Coils in lengths standard with manufacturer but not less than 100 feet.
Exterior Corners:	Premolded.
Interior Corners:	Premolded or formed on job.
Ends:	Premolded.
Color and Pattern:	To be determined

Products:
1. Flexco "Plus+"
2. Nora
3. Roppe
4. Johnsonite
5. Or Equal

RUBBER ACCESSORIES PRODUCT DATA SHEET

Product Description:	Tile/Carpet Joiner
Profile and dimensions:	Tile/Carpet Joiner: Item #50, 1" x 7/32"
Color:	To match rubber base

Products:
1. Flexco*
2. Roppe
3. Nora
4. Or Equal

END OF SECTION

SECTION 09900

PAINTING

PART 1. GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-l Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. Extent of painting work is indicated on drawings and schedules, and as herein specified.

1. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
2. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
3. Work includes field painting of exposed bare and covered pipes and ducts, and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.
4. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
5. Surfaces to be Painted: Paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Owner's Representative will select these.
   a. Exterior metal: All surfaces of galvanized and black steel, exterior metal stacks, ducts, vents, handrails, etc., shall be painted throughout.
   b. All paint grade metal doors and frames shall be painted.
   c. Gyp. board: Exposed surfaces shall be painted as scheduled. Where painting is done prior to installation of fixed permanent equipment, the space behind such equipment shall be painted. Where painting is done following installation, the equipment shall be carefully masked and painting brought up to such equipment.
   d. Interior steel and sheet metal, which are not factory-finished, shall be painted on all surfaces. Factory prime coat, properly touched up, will be sufficient for fully concealed surfaces, such as those incorporated in walls. All other surfaces shall be given full painting as specified.
   e. Electric panels, cabinets, access panels, diffusers, boxes, louvers and similar items in or on finished walls or ceilings shall be painted as directed by Owner's Representative, except where factory-finished to match acoustical tile ceiling. Specifically included shall be the exposed trim on light fixtures, diffusers, grilles and similar exposed items.
   f. All exposed surfaces of steel overhead and rolling doors shall be painted
   g. Exposed metal parts of weather-stripping and similar stripping at doors shall be painted.
   h. See also "Application" portion of this section for miscellaneous painting requirements.
6. Following categories of work are not included as part of field-applied finish work.
   a. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) plastic laminate countertops, toilet enclosures, acoustic and thermal insulation materials, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
   b. Concealed Surfaces: Unless otherwise indicated, color coat or finish painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, furred areas, utility tunnels, pipe spaces, and duct shafts

c. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized or factory painted aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
d. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.
e. The space above finished ceilings, including structure, piping ducts, conduits; etc., in said space unless specifically noted to be painted

7. Following categories of work are included under other sections of these specifications.
a. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.
b. Unless otherwise specified, shop priming of fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.

8. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE:

A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.
B. Samples: Prior to beginning work, furnish color sample brushouts for each color for each surface to be painted.
C. Field Samples:
1. Job samples no smaller than 4' x 6' shall be applied directly on surface to be finished, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work. Samples shall be refinished after completion of painting.
2. Job samples shall represent quality of proposed work. Finished work shall match and be equal in all respects to approved samples. Final acceptance of colors will be from samples applied on the job.

1.5 DELIVERY AND STORAGE:

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's name.
5. Contents by volume, for major pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.
8. Color name and number.
B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
C. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.6 JOB CONDITIONS:

A. Apply water base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50°F (l0°C) and 90°F (32°C), unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C), unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

D. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with requirements, provide products of one of the following, unless specifically noted otherwise:

1. ICI (Dulux Paints)
2. Dunn-Edwards
3. Kelly Moore
4. Benjamin Moore and Co. (Moore)
5. PPG Industries, Pittsburgh Paints (Pittsburgh)
6. The Sherwin-Williams Company (S-W)
7. Or approved equal

2.2 MATERIALS GENERAL:

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

B. Unless another manufacturer is specified, trade names and numbers used in this Section are those of ICI Dulux (unless specifically noted otherwise). Where numbers are used to identify paint, this number indicates the paint in white. Material shall be provided in color selected. Materials selected for coating system for each type surface shall be products of a single manufacturer.

C. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

2.3 PRIMERS

A. Latex-Based Interior White Primer: Latex-based primer coating used on interior gypsum drywall under a flat latex paint, an acrylic eggshell or semi-gloss enamel.

1. Dulux: 1030 Ultra Hide P.V.A. Sealer

B. Synthetic, Rust-Inhibiting Primer: Quick-drying, rust-inhibiting primer for priming ferrous metal on the exterior under high-gloss and semi-gloss acrylic enamel and on the interior under flat latex paint, eggshell paint or odorless acrylic semi-gloss or high-gloss enamels:

1. Dulux: 4160 DevGuard Primer

C. Galvanized Metal Primer: Primer used to prime interior and exterior zinc-coated (galvanized) metal surfaces:

1. Dulux: 4020 Devflex

D. Acrylic Latex Primer Sealer: Acrylic latex primer sealer for use on interior wood surfaces under a high-gloss or semi-gloss acrylic enamel paint.

1. Dulux: 3210 Gripper

2.4 UNDERCOAT MATERIALS

A. Interior Enamel Undercoat: Ready-mixed enamel for use as an undercoat over a primer on ferrous or zinc-coated metal under an interior alkyd semigloss enamel or a full-gloss alkyd enamel:

1. Dulux: 1120 Ultra Hide Alkyd Undercoat

B. Exterior Pretreatment: Pretreatment for use on zinc-coated metal under an exterior acrylic semi-gloss enamel or a acrylic full-gloss enamel, when recommended by manufacturer:
   1. Dulux: 88 Devprep
C. Exterior Acrylic Undercoat: Ready-mixed acrylic primer for use as a primer over wood surfaces under a exterior acrylic semi-gloss enamel or a acrylic full-gloss enamel:
   1. Dulux: 2000 Dulux

2.5 EXTERIOR PAINT MATERIAL
A. Acrylic Gloss Enamel: Weather-resistant high-gloss 100% Acrylic Enamel for use over primed ferrous metal surfaces:
   1. Dulux: 3038 Devflex
B. Acrylic Gloss Enamel: Weather-resistant high-gloss 100% Acrylic Enamel for use over primed, zinc-coated (galvanized) metal surfaces and aluminum:
   1. Dulux: 3038 Devflex
C. Acrylic Semi-Gloss Enamel: Weather-resistant semi-gloss 100% Acrylic Enamel for use over primed ferrous metal surfaces or wood surfaces:
   1. Dulux: 2406 Devflex
D. Acrylic Semi-Gloss Enamel: Weather-resistant semi-gloss 100% Acrylic Enamel for use over primed, zinc-coated (galvanized) metal surfaces and aluminum:
   1. Dulux: 2406 Devflex

2.6 INTERIOR PAINT MATERIALS
A. Latex-Based Interior Acrylic Enamel Flat Paint: Ready-mixed, latex-based paint for use as a flat finish over concrete and masonry surfaces, including filled concrete masonry block, mineral-fiber-reinforced cement panels, and plaster and over prime-coated gypsum drywall, ferrous metal, and zinc-coated (galvanized) metal surfaces:
   1. Dulux: 1201 Dulux Ultra
B. Interior Acrylic Enamel Eggshell Paint: Ready-mixed, latex-based paint for use as a eggshell finish over concrete and masonry surfaces, including filled concrete masonry block, mineral-fiber-reinforced cement panels, and plaster and over prime-coated gypsum drywall, ferrous metal, and zinc-coated (galvanized) metal surfaces:
   1. Dulux: 1403 Dulux Ultra
C. Interior Odorless Acrylic Enamel Semi-gloss Paint: Low-odor, semigloss, acrylic enamel for use over a primer and undercoat on concrete, masonry (including concrete masonry block), plaster, wood, and hardboard and over prime-coated gypsum drywall, ferrous metal, and zinc-coated (galvanized) metal surfaces:
   1. Dulux: 1407 Dulux Ultra

PART 3. EXECUTION

3.1 INSPECTION:
A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.
B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION:
A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
   1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Owner's Representative in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

B. Gypsum Board: At Gypsum Board areas which are finished and indicated to be painted, apply minimum one coat of primer as recommended by paint and gypsum board manufacturer, to seal gypsum board finishing and prepare wall.

C. Ferrous Metals:
1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
2. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.

D. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION:

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.4 APPLICATION:

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents. Colors not indicated shall be selected by Owner’s Representative.
2. Provide finish coats which are compatible with prime paints used.
3. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Paint surfaces behind equipment and furniture same as similar exposed surfaces.
5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
6. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
7. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.
8. Sand lightly between each succeeding enamel or varnish coat.
9. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.
10. Back prime on sheet metal before installation.
11. Do not paint over any Code-required label, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates. Neatly mask all such items and remove at completion of painting.

B. Scheduling Painting:
1. Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb

pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

D. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in equipment rooms and in occupied spaces such as Janitor, Mechanical Room, Electrical Room and similar spaces, as indicated on the drawings.

E. Prime Coats:
   1. Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.
   2. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

F. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

G. Transparent (Clear) Finishes:
   1. Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
   2. Provide satin finish for final coats, unless otherwise indicated.

H. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 CLEAN-UP AND PROTECTION:

A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove splattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. Protection:
   1. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Owner's Representative.
   2. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
   3. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.6 EXTERIOR PAINT SCHEDULE

A. Ferrous Metal: Primer is not required on shop-primed items.
   1. High-Gloss Acrylic Enamel: 2 finish coats over primer.
      a. Primer: Synthetic Rust-inhibiting Primer
      b. First Coat: Acrylic Gloss Enamel
      c. Second Coat: Acrylic Gloss Enamel

B. Zinc-Coated Metal:
   1. High-Gloss Acrylic Enamel: 2 finish coats over primer.
      a. Pretreatment: Exterior Pretreatment
      b. Primer: Galvanized Metal Primer
      c. First Coat: Acrylic Gloss Enamel
      d. Second Coat: Acrylic Gloss Enamel

C. Ferrous Metal: Primer is not required on shop-primed items.
   1. Semi-Gloss Acrylic Enamel: 2 finish coats over primer.
      a. Primer: Synthetic Rust-inhibiting Primer

b. First Coat: Acrylic Gloss Enamel
c. Second Coat: Acrylic Gloss Enamel

D. Zinc-Coated Metal:
1. Semi-Gloss Acrylic Enamel: 2 finish coats over primer.
a. Pretreatment: Exterior Pretreatment
b. Primer: Galvanized Metal Primer
c. First Coat: Acrylic Semi-Gloss Enamel
d. Second Coat: Acrylic Semi-Gloss Enamel

E. Wood:
1. Semi-Gloss Acrylic Enamel: 2 finish coats over primer.
a. Primer: Exterior Acrylic Undercoat
b. First Coat: Acrylic Semi-Gloss Enamel
c. Second Coat: Acrylic Semi-Gloss Enamel

3.7 INTERIOR PAINT SCHEDULE

A. Gypsum Drywall Systems:
1. Flat Acrylic Enamel Finish: 2 coats over primer.
a. Primer: Latex-Based Interior White Primer
b. First Coat: Latex-Based Interior Acrylic Enamel Flat Paint
c. Second Coat: Latex-Based Interior Acrylic Enamel Flat Paint
2. Eggshell Acrylic Enamel Finish: 3 coats with total dry film thickness not less than 2.5 mils.
a. Primer: Interior Latex-Based White Primer
b. First Coat: Interior Acrylic Enamel Eggshell Paint.
c. Second Coat: Interior Acrylic Enamel Eggshell Paint.
3. Odorless Semi-gloss Acrylic Enamel Finish: 3 coats with total dry film thickness not less than 2.5 mils.
a. Primer: Interior Latex-Based White Primer
b. First Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint.
c. Second Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint.

B. Ferrous Metal:
1. Semi-gloss Enamel Finish: 2 coats over primer with total dry film thickness not less than 2.5 mils.
a. Primer: Synthetic Rust-Inhibiting Primer
b. First Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint
c. Second Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint

C. Zinc-Coated Metal:
1. Semigloss Finish: 2 coats over primer, with total dry film thickness not less than 2.5 mils.
a. Primer: Galvanized Metal Primer
b. First Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint
c. Second Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint

D. Wood:
1. Eggshell Acrylic Enamel Finish: 3 coats with total dry film thickness not less than 2.5 mils.
a. Primer: Interior Acrylic Latex Primer Sealer
b. First Coat: Interior Acrylic Enamel Eggshell Paint.
c. Second Coat: Interior Acrylic Enamel Eggshell Paint.
2. Odorless Semi-gloss Acrylic Enamel Finish: 3 coats with total dry film thickness not less than 2.5 mils.
a. Primer: Interior Acrylic Latex Primer Sealer
b. First Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint.
c. Second Coat: Interior Odorless Acrylic Enamel Semi-gloss Paint.

END OF SECTION

DIVISION 10 SPECIALTIES

SECTION 10005

MISCELLANEOUS SPECIALTIES

PART 1 GENERAL

1.1 SCOPE: Provide miscellaneous specialties, complete.

1.2 SUBMITTALS: Comply with Section 01300. Submit installation instructions for each specialty item.

A. Product Data: Submit manufacturer's technical data and installation instructions for accessory item specified.

B. Shop Drawings: Submit shop drawings indicating location, details of installation, finishes, and other pertinent data.

C. Samples: Submit samples of full color line for Architect's selection for materials, fabrics, and other items specified.

D. Signage: Submit one sample illustrating methods of raised symbols and copy as required per ADAAG and ANSI 117.1 - 1986. Submit shop drawings showing sign sizes, copy, symbols, letterform and letter heights.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHER AND CABINET:

A. Cabinet: Steel cabinet for semi-recessed installation. Provide cabinet with door with plexi-glass window. Provide in manufacturer's standard white color.

B. Extinguisher:

1. Multi-purpose, “ABC” Type, 10 lb. heavy duty steel extinguisher, with semi-recessed cabinet. See plans for locations

2. Kitchen: 20 lb. “K” Type, surface mount wall bracket.(no cabinet)

2.2 SIGNAGE

A. Provide signage for locations as shown on the drawings and as specified herein.

1. Provide Toilet Room signage as manufactured by or equal to Mohawk Sign Systems Series 200A: Sand-Carved. Signs shall comply with ADAAG (Americans with Disabilities Act Guidelines) and ANSI (American National Standards Institute) 117.1. Raised Tactile Grade 2 Braille shall be integral with the sign face and shall be raised 1/32".

a) Toilet Room Identification signs: At each handicap accessible toilet room, provide one sign (8" x 8") with either "MEN", "WOMEN" or "RESTROOM" (for uni-sex) as indicated by room use. Each sign shall have 4" accessibility symbol, gender symbol and copy below followed by Grade 2 Braille

2. Exterior handicap parking signs shall be M203-9 Black duranodic aluminum frame sign, size 9" x 9". Signs shall comply with ADAAG (Americans with Disabilities Act Guidelines) and ANSI (American National Standards Institute) 117.1. Raised Tactile Grade 2 Braille shall be integral with the sign face and shall be raised 1/32".

a) Accessible Parking: At each accessible parking space, provide one sign (12" x 18" reflective) with accessibility symbol and either "PARKING" or "VAN ACCESSIBLE" (where indicated on drawings). Mount at 54" above finish grade on galvanized steel U-channel posts.

3. All other signage by owner

B. Character Proportion: Letters and numbers on signs shall have a width-to-height ratio of between 3:5 and 1:1 and a stroke to width-to-height ratio between 1:5 and 1:10.

C. Color Contrast: Characters and symbols shall contrast with their background - either light characters on a dark background or dark characters on a light background.

D. Raised or Indented Characters or Symbols: Letters and numbers on signs shall be raised or incised 1/32" minimum and shall be sans serif font. Raised characters or symbols shall be at least 5/8" high, but no higher than 2". Indented characters or symbols shall have a stroke width of at least 1/4". Symbols or pictographs on signs shall be raised or indented 1/32" minimum.

E. Symbols of Accessibility: All accessible facilities required to be identified shall use the international symbol of accessibility.

F. Mounting Height and Location: Interior signage shall be located alongside the door on the latch side and shall be mounted at a height of between 54" and 66" above finish floor.

G. Mounting: Signs shall be mounted using vinyl tape for interior signs and concealed holes and screws for exterior frame signs. Interior signs shall be mounted on wall with center at 60" above finish floor on the latch side of door and approximately 2" from door frame. Provide any and all accessories necessary for mounting of signs including vinyl tape, screws/fasteners, posts or standoff channels in order to securely and permanently mount signs as directed by Architect.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that surfaces and internal wall blocking are ready to receive work and opening dimensions are as indicated on shop drawings or as instructed by the manufacturer.

3.2 INSTALLATION

A. Install each accessory in compliance with manufacturer's instruction and final shop drawings.

B. Install at locations and mounting heights indicated or as directed by Architect.

C. Secure units level and plumb.

END OF SECTION

SECTION 10800

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SCOPE: Provide toilet accessories, complete, for toilet rooms.

1.2 SUBMITTALS: Comply with Section 01300
- A. Product Data: Submit technical data and installation instructions for each toilet accessory.
- B. Shop drawings: Submit shop drawings showing grab bar installation. Provide setting drawings, instructions and directions for installation of anchorage devices in other work.

1.3 JOB CONDITIONS:
- A. Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- B. Provide proper backing or blocking within walls for adequate structural support and anchorage of all accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Bobrick, Bradley, or ASI.

2.2 MATERIALS
- A. Stainless Steel: ANSI Type 302/304, No. 4 finish, 22 gage minimum.
- B. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

2.3 ACCESSORIES
- A. Paper Towel Dispensers: Bobrick B-4262
- B. Soap Dispensers: Bobrick B-5050
- B. Grab Bars: Bobrick B-6106.99 Series, Bradley 812-2 Series, or ASI 3200-P, shapes and sizes as indicated. Strongly secure fastenings to steel backing plate or by other accepted methods to withstand contemplated stresses.
- C. Toilet Paper Dispenser, Surface Mounted, jumbo roll tissue dispenser equal to Kimberly Clark model no.09612
- D. Mirrors: Provided for in Section 08800, GLASS & GLAZING

PART 3 EXECUTION

3.1 INSTALLATION
- A. Install toilet accessory units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit.
- B. At grab bars strongly secure fastenings to steel backing plate or by other accepted methods.
- C. Install units plumb and level, firmly anchored in location and at heights indicated or directed by Architect.

END OF SECTION

SECTION 13121

PRE-ENGINEERED STEEL BUILDING SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES: Pre-engineered steel building system, complete with structural framing (columns, rafters, struts, purlins, girts); prefinished roofing, siding; roof and wall insulation; metal flashings; trim; gutters and downspouts; diagonal bracing; fasteners; roof and wall accessories and other components and material required for a complete installation.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Structural Steel: Section 05120
- B. Building Insulation: Section 07210
- C. Metal Doors and Frames: Section 08110

1.3 DESCRIPTION
- A. Building Type: Clear span double slope rigid frame with uniform depth (straight) columns and tapered rafter sections (as shown on drawings) made of shop welded steel plates.
- B. Roof Slope: As shown on drawings.
- C. Column Spacing at Exterior Walls: As shown on drawings and compatible with placement of openings shown on drawings and any other requirements.
- D. Eave Height: As shown on drawings, measured vertically from top of eave strut at sidewall steel line to base of sidewall frame column. Any minimum vertical clearance from finish floor to underneath the rigid frame rafters at the sidewalls or otherwise shall be as shown on drawings.

1.4 QUALITY ASSURANCE
- A. For the structural design and manufacture of the steel building system, use the following codes and Standards throughout:
  1. AWS D1.1 "Structural Welding Code-Steel."
  2. MBMA "Low-Rise Building Systems Manual," latest edition and supplements.
  3. AISI "Specifications for the Design of Cold Formed Steel Structural Members," latest edition.
  4. AISC "Steel Construction Manual" and "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."
  5. AISC "Specification for Structural Joints Using ASTM A325 or ASTM A490 bolts."
  6. Applicable portions of the Structural Steel Painting Council (SSPC) Standards, as referenced herein.
  7. American Society for Testing and Materials (ASTM), Standards as referenced herein.
- B. The steel building system manufacturer shall be certified in accordance with American Institute of Steel Construction (AISC) quality certification program category MB for metal buildings. This certification is to cover areas of general management, engineering and drafting, procurement, operations and quality control. The manufacturer shall provide proof of certification.
- C. All structural building design shall be in compliance with the International Building Code (IBC) 2003 and regulations of any other governing authorities having jurisdiction at project site.
- D. Minimum Structural Design Criteria:
  1. Importance Factor Classification (IBC Table 1604.5): Category II
  2. Wind Exposure Category (IBC Section 1609.4): Exposure C
  3. Wind Velocity (IBC Section 1609.3): 90 mph for fastest mph wind speed
  4. Roof Live Load (IBC Section 1607.11.2): 20 psf
  5. Roof Snow Load (IBC Section 1608): 30 psf :Snow Exposure Factor: partially exposed Thermal Factor: 1.0, Ground Snow Load: 30 psf
  6. Seismic Load (IBC Section 1614): Site Class Definition - Class C
  7. Collateral Load (for conditions shown on drawings): 5 psf
  8. Uplift Certification: UL 580 Uplift - Class 90
  9. Deflections (Maximum)
     - a) Vertical:
       - 1) Roof panels: L/150 Roof or live snow load

2) Purlins: L/150 supporting metal roof only;
L/240 supporting lay-in ceilings
L/360 supporting drywall/plaster ceilings
3) Rafters: L/150 supporting metal roof only;
L/240 supporting lay-in ceilings
L/360 supporting drywall/plaster ceilings
4) Lintel beams: Total load; L/600 (Maximum 0.3");
Horizontal: (10yr. design wind pressure=50yr.x75%)
5) Wall panels: 10 year design wind pressure; L/120
6) Girts: 10 year design wind pressure:
L/120 supporting metal wall
L/240 (max 1-1/2") supporting masonry wall
7) Frames: 10 year design wind pressure
H/60 supporting metal wall
H/100 supporting masonry wall
Crane lateral load or 10 year design wind pressure:
H/100 (at runway) pendant operated crane
H/240 (maximum 2" at runway) cab operated crane
8) Spandrel beams: 10 year design wind pressure L/240
9) Minimum load combinations to be considered:
a. D + L
b. D + S
c. D + A
d. D + W (or E)
e. D + S + A
f. D + S + E
g. D + ½ W (or E) + A
h. D + S + .5W
i. D + ½ S + W
where:
D = Dead plus collateral loads
L = Roof live loads
S = Roof snow loads
W = Wind loads
E = Seismic loads
A = Auxiliary loads

NOTES:

(1) For multistory buildings, or buildings with mezzanines, floor live loads shall be combined with the dead loads including specified collateral loads or with loading combinations (a) through (i), if the result is more severe.

(2) Roof snow loads in loading combination (e) shall be: Zero when the roof snow loads are less than or equal to 13 PSF; .5S when it is greater than 13 PSF, but less than 31 PSF; .75S when it is equal to or greater than 31 PSF.

(3) Roof snow loads in loading combination (f) shall be: Zero when roof snow loads are less than 31 PSF; .25S when it is equal to or greater than 31 PSF.

(4) For the load combination (g) in the case D + 1.0E + A, the Auxiliary Crane Loads shall include the total weight of crane including bridge with end trucks and hoist with trolley.

1.5 SUBMITTALS

A. General: Comply with Section 01300.

B. Shop Drawings and Calculations:

1. Design Calculations and Erection Drawings: Prepared by, or under direct supervision of, Registered Professional Engineer, licensed to practice in the state where the project is to be constructed and with all drawings and calculations bearing his seal.

2. Show each type structural building frame required and their locations within structure; details of anchor bolt settings; sidewall, end wall, and roof framing; diagonal bracing and location within

structure; metal floor deck and joist types; wall and roof insulation and types; longitudinal and transverse cross sections; details of curbs, roof jacks, and items penetrating roof; canopy framing and details; trim, gutters, downspouts, liner panels, wall and roof coverings, and all accessory items; materials; finishes; construction and installation details; and other pertinent information required for proper and complete fabrication, assembly and erection of watertight building system.

C. Material and Color Samples:
   1. For each specific material sample requested by Engineer, submit in size, form, and number directed.
   2. Submit duplicate color sample sets showing full color range available, for selection purposes.

D. Product Data: Two (2) copies of manufacturer's specifications and descriptive literature.

E. Certification: Two (2) copies of written certification, prepared and signed by Registered Professional Engineer licensed to practice in the state where the project is to be constructed, attesting that the building design submitted meets all specified loading requirements, requirements of codes and authorities having jurisdiction at the project site, and any other requirements specified by this document.

F. Steel building system manufacturer shall submit to the Architect, certification that the design is by an approved manufacturer and that the roof system shall qualify for UL Class 90 and state construction number.

1.6 PRODUCT HANDLING, DELIVERY AND STORAGE

A. Deliver and store prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed.

B. Stack materials on platforms or pallets above grade or on concrete slab, covered with opaque tarpaulins or other approved weather-resistant ventilated covering.

C. Store metal sheets and panels if subjected to water accumulation in such a manner so they will drain freely. Do not store sheets and panels in contact with other materials which might cause staining.

D. Damaged material shall be reported to the steel building system manufacturer and the Architect to determine if replacement is required.

E. Inspect panels to prevent moisture between panels, and secure as required.

1.7 WARRANTIES

A. All Components: Standard one (1) year workmanship warranty.

B. Roof Panels including any Canopy Roof Panels: Twenty (20) year paint finish warranty, twenty (20) year no-perforation warranty and twenty (20) year weathertightness warranty.

C. Wall Panels: Twenty (20) year paint finish warranty.

D. Roof and wall panels with full 70% polyvinylidene fluoride (Kynar) finish: Twenty (20) year warranty covering color fade in addition to that described above.

E. All roof and wall panels shall have twenty (20) year film integrity warranty in addition to that described above against any peeling, cracking, blistering, etc. of the paint finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS: The metal building system shall be as manufactured by SCHULTE BUILIDING SYSTEMS (SBS), Houston, Texas or other equal as approved by the Architect.

2.2 STRUCTURAL STEEL

A. Materials:
   1. Structural Plate or Bar Stock: Minimum yield strength (Fy) of 50,000 PSI.
   2. Cold Formed Structural Steel: Minimum yield strength (Fy) of 55,000 PSI.
   3. Primary Structural Bolts and Nuts: ASTM A325.
   4. Prime Coat Paint: Primer shall be SSPC 15, type 1, red alkyd primer minimum one mil thickness.

B. Fabrication:
   1. Primary Framing: Rigid frames of shop-welded steel plate columns and rafters, both tapered and uniform depth sections as required by drawings, complete with all necessary stiffeners,

connection plates and holes for field-bolted assembly.

a) Columns and Rafters: Fabricated with holes in web and/or flanges for attachment of secondary members.

b) Splice Plates: Factory fabricated for precise rafter-to-rafter and/or column-to-rafter connections, complete with connection bolt holes.

c) Base Plates, Cap Plates, Splice Plates and stiffeners: Fabricate to sizes required, complete with all holes for connection of primary and secondary structural members. Factory weld into place.

d) Join flanges and webs of structural members fabricated of plate or bar stock together by continuous automatic submerged arc welding process with all welding performed under the supervision of certified welders in accordance with standard practices of AWS D1.1.

e) Make all primary rigid frame field-bolted connections with A325 high-strength bolts of size required by building system manufacturer.

f) Clean all components of oil, dirt, loose scale, and foreign matters. Factory paint with primer.

2. Endwall Framing: Cold-formed and/or shop-welded steel plate members consisting of rafters and columns fabricated for field-bolted assembly.

a) Columns, Rafters, Splice Plates, Clips, Angles and Channels: Factory fabricate to size required.

b) Plate Stock Endwall Framing Members: Join flanges and webs by continuous automatic submerged arc welding process, under the supervision of welders certified in accordance with standard practices of AWS D1.1.

c) Clean components of oil, dirt, loose scale and foreign matter and factory paint with primer.

3. Secondary Framing, (Purlins, Girts, Struts, Flange Braces, Base Angles, as required):

a) Purlins: Zee sections roll formed from minimum (Fy) 55,000 PSI steel and pre-punched for attachment to frames.

b) Girts: Zee or Cee channel sections of roll formed Fy 55,000 PSI steel and pre-punched for attachment to frames.

c) Eave Struts: Roll formed sections of minimum Fy 55,000 PSI steel, with vertical web to receive sidewall panels and minimum four (4) A325 bolt attachments to rigid frame in factory-punched holes in column or bracket.

d) Roof Struts: Provide as required, detailed and shown on final shop drawings, as required by design analysis, with attachment to top flange or rigid frame rafters by minimum two (2) 1/2" minimum size diameter bolts at each end of strut.

e) Flange Braces: Steel angles attached to purlin or girt, to stiffen rigid frame flanges as dictated by design and noted on final shop drawings.

f) Base Angle for Wall Panels: Minimum 0.071" thickness angle of commercial grade steel, for field attachment to foundation with approved type drive anchors.

g) Clean secondary framing components to be free from oil, dirt, loose scale and foreign matter and factory paint with primer.

2.3 ROOFING & SIDING

A. Roofing and Siding Panels

1. Standing Seam Roof Panels:

a) Roof panels shall be standing seam type, roll-formed to provide 20" net coverage from 24-gauge, 50,000 PSI minimum yield steel. The panel edges shall join together to form a 2" high box rib with a 7/8" high standing seam. The seam shall be machine-closed, double lock (360 degrees) design with factory-applied sealant. The

panel flats shall be embossed with cross ribs at maximum 6" o.c. to minimize oil-can and flutter. The panel ends shall be factory-notched for end splicing (when required). Panels shall be longest length possible to minimize end splices. The panels shall be secured to the structure with concealed clips designed to accommodate the roof expansion/contraction and to provide insulation stand-off as necessary. Perimeter trim, start/finish panels, ridge cover and transition flashing shall be provided and shall be designed to accommodate the roof's expansion/contraction. All Closures, sealants and fasteners shall be provided as required for a weathertight installation.

2. Wall Panels:
   a) Wall panels shall be roll-formed to provide 36" net coverage from 26-gauge, 50,000 PSI minimum yield steel. The panels shall have 1-1/8" high major ribs 12" o.c. with two minor ribs symmetrically spaced between the major ribs or as shown on drawings. Panel side laps shall be formed by lapping major ribs at the panel edges. The underlapping rib shall have full bearing legs to support the side lap. Panels shall be longest length possible to minimize end laps. Panel end splices (when required) shall be over a structural member and shall be a 4" minimum lap. Corner trim, base trim and transition flashings shall be provided as required to complete the wall assembly. All Closures and fasteners shall be provided as required for a weathertight installation.
3. Panel Finishes:
   a) Roof Panels: Aluminum-zinc alloy coating conforming to the requirements of ASTM A792. Color as selected from standard color selections.
   b) Wall Panels: Aluminum-zinc alloy coating with color as selected full 70% polyvinylidene fluoride (Kynar) finish. Color selected from standard color selections
4. Fasteners: Length dimension for wall/roof panel attachment screws must be as necessary to accommodate the thicknesses of the panel style and any insulation allowance for the specified type of application. All exposed fastener heads shall be factory colored to match color of the panels. All fasteners used for the project shall at a minimum be as recommended for the intended application by the steel building system manufacturer or the steel panel manufacturer.
   a) Wall Panels: Cadmium or zinc plated minimum #12 self-drilling carbon steel screws with hex washer head. All screws shall be factory coated with a premium coating which protects against corrosion and weathering.
   b) Roof Panels: Minimum #12 self-drilling carbon steel screws with molded zinc alloy or capped stainless steel cupped hex washer head and EPDM sealing washer.
      1) Exposed Fasteners for Eave, End Splice, Ridge Cover and Flashings: Minimum #14 self-drilling carbon steel screws with molded zinc alloy or capped stainless steel cupped hex washer head and EPDM sealing washer.
   c) Roof Panel Expansion Clips: Cadmium or zinc plated minimum #12 self-drilling carbon steel screws with hex head.
   d) Trim Fasteners: Plated and finish painted #8 self-drilling carbon steel screws with 1/4" hex washer head.
5. Roof Panel Tube Sealant: Non-skinning butyl-based sealant, Sikalastamer-511 service temperature range -60 degrees F to 220 degrees F or approved equal.

2.4 WIND BRACING

A. Commercial grade steel rod bracing or portal frames located as shown on the drawings or in other locations as approved by the Architect which do not conflict with designed openings, etc.
   1. Steel Rod Bracing: Provide complete with necessary slope washers, flat washers and adjusting nuts at each end.
B. Clean components free of oil, dirt, loose scale and foreign matter.

2.5 BUILDING INSULATION: Refer to Specifications Section 07210 Building Insulation for further information.

A. Wall and Roof Fiberglass Insulation:
   1. Non-combustible fiberglass blanket insulation with flexible vapor barrier providing no more than 0.09 PERMS moisture vapor transmission (ASTM- E-96 Method A), minimum 4" thick R-13 for steel building system walls and minimum 4" thick R-13 for steel building roof structure unless shown otherwise on drawings.

2. Provide insulation and facing (as a composite material) carrying UL fire hazard (UL 723) rating indicating a flame spread rating of 10 or less.
3. Alternate insulation to be equal to Guardian's Energy Saver system with limited built in fall protection. "R" values determined by size of girts and purlins.
    1. Roof to be minimum R-30
        a) Steel Building Manufacturer to provide high roof clips and thermal blocks.
    2. Wall insulation to be minimum R-30

2.6 ACCESSORIES

A. Gutters and Downspouts

1. Gutters shall be suspended box sections fabricated of minimum 26 gauge G90 zinc-coated (galvanized) or AZ50 aluminum-zinc alloy-coated and factory-colored steel. Gutters shall be formed to match the configuration of the gable trim and shall have a minimum cross sectional area of 36 square inches. Gutters shall be attached to the roof structure as specified on the steel building system manufacturer's erection drawings. Gutter section splices shall be lapped and sealed and end closures shall be sealed with aluminized sealant and then fastened with trim fasteners.
2. Downspouts shall be fabricated of minimum 29 gauge G90 zinc-coated (galvanized) or AZ50 aluminum-zinc alloy-coated factory-colored steel. Downspouts shall be minimum size/configuration and location as shown on the drawings or, otherwise, shall be located and sized by the steel building system manufacturer according to design requirements shown on the drawings and as specified. Downspouts shall be attached to a thimble installed in the gutter. Downspouts shall be attached to the wall panel using minimum 26 gauge galvanized factory-colored steel straps on maximum 10'-0" centers. A 75 degree elbow shall be provided at the base of all downspouts to direct the water flow away from the building.
3. Finish: Siliconized polyester system finish in color as selected by Architect.

B. Walk Doors, Leafs, Frames and Hardware: Refer to Section 08110 Metal Doors and Frames for further information.

1. Frames: Fabricated from minimum 14 gauge steel with G-60 galvanized coating and with minimum 5-3/4" deep frame profile. Provide complete with 18 gauge sill channel, 22 gauge adapter angles, galvanized reinforcements and preparations required for finish hardware. Provide factory-applied bronze colored rust inhibitive prime coat finish.
2. Leafs: In size shown on drawings, not less than 1-3/4" thick, of flush panel design or as shown on drawings. Fabricate from minimum 18 gauge steel with G-60 galvanized coating. Provide complete with internal reinforcements, stiffeners, sound deadening core material, preparation required for finish hardware. Provide factory-applied bronze colored rust inhibitive prime coat finish.
3. Finish Hardware: Provide the minimum following hardware in quantity required for operational installation of doors:
    a) Hinges: Three standard, regular weight, full mortise type per door leaf.
    b) Weatherstripping: Standard type for attachment to door frames.
    c) Thresholds: Aluminum type, factory-notched at each end for tight fit to jamb frames.
    d) Mortise Locks: Heavy duty type with dull chrome finish 26D, Government No. 86, or approved equal.
    e) Cylinder Locks: Dull chrome finish 26D with 2-3/4" backset, Government No. 160 or approved equal.

C. Roof Jacks, Pipe Flashings and Roof Curbs:

1. Roof jacks shall be minimum 26 gauge steel cone, Shell White factory installed and sealed to roof panel. Cone shall be made of same material as roof panel.
    a) Stack or pipe penetration shall be at the centerline of a roof panel.
2. Pipe flashing shall consist of a molded EPDM rubber cone with an aluminum ring bonded to the base. Pipe flashing shall accommodate pipe diameter as necessary and be capable of flashing penetration at any location of the roof panel. Flashing shall be sealed and fastened in accordance with manufacturer's instructions. Use "Dektite" by Buildex or other approved equal. Paint flashing and pipe same color as roof.
3. Roof curbs shall be made of minimum 18 gauge AZ55 aluminum-zinc alloy-coated steel. Curbs

shall have an integral cricket type water diverter for the upstream end. Curbs shall be minimum 8" high. All roof curbs shall be furnished by the supplier of the metal roof system and shall be factory made for the specific roof system to be used for the project.

PART 3 EXECUTION

3.1 ERECTION

A. General
1. Erection shall be accomplished by a trained, competent erector having experience in erecting metal buildings.
2. Install all metal building system components in strict compliance with manufacturer's instructions shown on final shop drawings.
3. Handle and store all materials to avoid damage and replace any damaged materials.
4. Erector shall observe and follow recommendations of the Metal Building Manufacturers Association (MBMA) practice and procedures where applicable.
5. Do not field cut or alter structural members without approval from steel building system manufacturer.

B. Structural Frames:
1. Erect true to line, level and plumb, brace and secure with temporary bracing in all directions as required.
2. Level base plates and secure to anchor bolts to level plane with full bearing to foundation supporting structures.

C. Bracing:
1. Install all permanent diagonal rod or angle bracing in roof and sidewalls as approved by manufacturer.
2. Properly tighten rods to avoid excessive sag.

D. Framed Openings:
1. Securely attach to building structural framing members, square and plumb.

E. Roofing and Siding Panels:
1. Roof Panels:
a) Install roof panels in such a manner to permit drainage to eaves of building, with panel ends perpendicular to eave line.
b) Install wall panels with vertical edges plumb.
c) Arrange and nest side lap joints away from prevailing winds when possible.
d) Apply panels and associated items for neat and weathertight enclosure.
e) Avoid "panel creep" or application not true to gridlines.
f) Protect factory finishes from mechanical damage or abrasions.
g) Install approved type closures to exclude weather.
1) Install weather seal under ridge cap. Flash and seal roof panels at eave, gable and perimeter of all openings through roof and elsewhere as required or shown on drawings.
2) Flash and/or seal wall panels at perimeter of all openings, under eaves and gable trims, along lower panel edges, and elsewhere as required or shown on drawings, as applicable.
h) Remove all fastener or cutting shavings from roof and wall as erection is completed.
2. Wall Panels:
a) Install wall panels on exterior side of metal framing at locations shown on drawings.
b) Align bottoms of panels to proper coverage and fasten with manufacturer's recommended and supplied fasteners.
c) Cut and fasten flashing and trims with approved type fasteners.
d) Install all fasteners with power tool having adequate torque and proper r.p.m. adjusted to seat fastener without damage to heads, washers or panels.
e) Install panel side lap away from prevailing wind or view direction when possible, maintaining proper lap without fastener dimpling or excessive overlap.

F. Accessories: Install gutters, downspouts, flashings, trim, ridge covers, roof curbs, pipe flashings, closure

strips, roof jacks, and other accessories and sheet metal items in accordance with manufacturer's recommendations for positive attachment to building and provide a weathertight mounting.

G. Swing Doors and Frames: Install doors and frames straight, plumb, and level. Securely anchor frames to building structure. Set units with 1/8" maximum clearance between door and frame at jambs and head, and 3/4" maximum between door leaf and floor. Adjust for proper operation.

H. Thermal Insulation:

1. Install in accordance with manufacturer's recommended procedure, performed concurrently with installation of wall and roof panels.
2. Roof and Wall Insulation: Install blankets straight and true. Fasten tabs together or lap and glue to provide complete vapor barrier. Place insulation with facing exposed to interior of building unless recommended otherwise.

3.2 PAINTING

A. Touch-up all abrasions, scratches, field welds or other damages in shop-primed or factory-finished painted surfaces consistent with shop primer or factory-finished painting.

B. Apply finish paint coats to factory-primed items.

1. Provide finish coats which are compatible with metal building manufacturer's prime coat paints.
2. Provide approved type barrier coats over incompatible primers where required.
3. Notify architect in writing of anticipated problems using specified coatings with substrates primed by others.
4. All finish coats by others should be solvent base material or approved by building manufacturer.
5. Protect hardware and accessories and similar items in place and not to be finish-painted.
6. Finish exterior swing doors on tops, bottoms and edges same as exterior faces, unless otherwise indicated.

3.3 TOLERANCES

A. All framing members shall be erected plumb, level or aligned not to exceed a deviation 1:300.

END OF SECTION

April 2, 2010

MECHANICAL – DIVISION 15000
ELECTRICAL – DIVISON 16000

PROJECT MANUAL

FOR

REEVES TIRE AND AUTO

NEW TIRE SERVICE CENTER

JOPLIN, MISSOURI

PREPARED BY
WALLACE PAYNE
REGISTERED ENGINEER
STATE OF MISSOURI

DIVISION 15 MECHANICAL

SECTION 15050

BASIC MATERIALS AND METHODS

PART 1

1.1 SECTION INCLUDES
- A. General Conditions
- B. Supplementary Conditions
- C. Division 1
- D. Mechanical basic requirements
- E. Electric Motors
- F. Pipe, Valve, & Equipment Identification
- G. Pipe Hangers & Accessories
- H. Access Boxes & Panels Vibration Isolators
- I. Vibration Isolators
- J. Flashing & Sleeves
- K. Painting of Equipment

1.2 SYSTEM DESCRIPTION
- A. Provide complete and fully operational systems with facilities and services to meet requirements indicated and in accord with applicable codes and ordinances.

1.3 REGULATORY REQUIREMENTS
- A. Plumbing: Conform to latest International Plumbing Code (International Code Council, ICC)
- B. Obtain permits, and inspections from authority having jurisdiction.
- C. HVAC: Conform to latest International Mechanical Code (International Code Council, ICC), NFPA 90A (Air Conditioning & Ventilating Systems) and NFPA 90B (Warm Air Heating & Air Conditioning Systems).
- D. Conform to all Local, City, & State codes as well as requirements of Fire Marshall, governmental agencies and Fire Rating Bureau having jurisdiction.

1.1 SUBMITTALS
- A. Submit under provisions of Division 01000 (Section 01001). Submit shop drawings and product data grouped to include complete, submittals of related systems, Products, and accessories in a single submittal.
- B. Mark dimensions and values in units to match those specified.
- C. Provide (1) one onsite training session and (2) complete sets of written instructions to the owner for operation and maintenance of all fixtures and equipment used on the project.
  1. All fixtures and equipment must be operational before onsite training takes place.
- D. Provide a set digital pictures on a CD for the owners record of all under-slab and in wall work after inspection by the building inspector having jurisdiction over the project and before backfill and/or wall materials are installed.(applies to all work hidden and unable to view at projects completion)
  1. Supply pictures of the type and minimum quality listed below.
     - a. JPEG image, 5 mega pixel or better set to the largest format possible.
     - b. Image must clearly show all items that will be hidden from view when project is completed. Pictures taken with telephone camera will not be accepted.
     - c. Pictures must be original pictures unedited, cropped or altered in any way.
  2. Supply a legend for the pictures to clarify the date, location, direction and/or wall in which the picture was taken.
  3. Submittal of these pictures to be part of project closeout 15050, 3.9

PART 2 PRODUCTS

2.1 ELECTRIC MOTORS
- A. Each contractor to provide motor starters and transfer switches for motors & pumps under their contract.
- B. Electric Service: Refer to Division 16000 for required electrical characteristics.
- C. Motors: For continuous operation in 40 degrees C environment, and for temperature rise to ANSIINEMA MG1 limits. Motor will operate satisfactorily without failure for a period of two (2) hours or more at ambient temperature of 120'F & with a minimum service factor of 1.5.

D. Single Phase Motors: Split phase, Permanent split capacitor, or Capacitor start as Required.
E. Three Phase Motors: Squirrel cage motors to ANSIINEMA MG1 Class B, high efficiency type with thermistor system for motor frame sizes 254T and larger, ball bearings.
F. Motors to be squirrel-cage type drip-proof enclosure unless otherwise indicated, constant speed, & across-the-line normal starting torque designed for quiet operation. Where T-frame motors are used, oversize motor by at least 10%.
G. Motors to be sized to develop the required brake horsepower & to operate satisfactorily with a voltage variation of ±10%, conforming to NEMA motor standards, dynamically balanced, & held to commercial tolerance.

2.2 PIPE, VALVE, & EQUIPMENT IDENTIFICATION
A. Equipment Nameplates: Laminated three-layer plastic (Bakelite) with engraved black letters on light background color. Or aluminum with etched or engraved lettering on black background. 2.5"x.75" size, securely fastened to the equipment.
B. Valve Tags: 18-gage polished brass, 1.5" in diameter & stamped for the appropriate service in _25' backfilled letters & stamped with 1.75" brass S-Hook.
C. Pipe Labels: Plastic clamp on legend & arrows, indicating contents of pipe & direction of flow. Identification shall be color coded per A-13.1 "Scheme of identification of Piping Systems."

2.3 PIPE HANGERS AND ACCESSORIES
A. Manufacturers: Equal Fee & Mason
B. Locations and Models:
1. Water & Hydronic.piping - #212 split ring hangers with support rods & Senile() 'trisolators".
3. Soil &.Waste piping - #212 adjustable ring hangers with support rods & #241 riser.clamps at each floor and as required.
4. Gas piping - #212 split ring hangers with support rods.
5. Air piping - #212 split ring hangers with support rods

2.4 ACCESS BOXES & PANELS
A. Walls; Equal Smith 444730 or Josam #8650 with polished chrome plate face in tile walls. Equal Smith #4730-AKL, or Josam #SLA or #SLB, with bonderized prime-coated steel face & Allen lock in was of other finished rooms.
B. Ceilings: Equal Acorn #8211-3-AKL or Josam #SLA bonderized prime-coated steel face with Allen lock.
C. Floors: Equal Smith 414910 or Josam 418630-5 with XH plain aluminum or nickel-bronze non-skid top. Equal Smith #4920 for floors covered with vinyl reinforced or pure vinyl title.
D. Yard Boxes; Equal Brooks 36 HF or Frazer #12 cast concrete boxes with cast iron rim & hinged self-closing cast iron lid marked for function (gas shutoff, water, etc.), size to 12"x18"x12". Set flush with finished grade with 4" thick concrete pad under perimeter (but not under interior) of box.

2.5 VIBRATION ISOLATORS
A. Equipment: Thy Curb Vibrocurbs or equal
B. Ducts: Vent-fabric flexible connections with minimum of 6” full length
C. Piping: Flexible connections, isolation hangers and expansion/contraction connectors
D. All devices shall not exceed a noise criterion curve of 35 db SPL when measured on the flat response “C” scale, in occupied spaces.

2.6 FLASHING AND SLEEVES
A. Concrete: Equal "Sperzel", rustproof, "Crete-Sleeve" at all penetrations through concrete, masonry, studs walls, or finished ceiling sized as required.
B. Drywall, wood, synthetic stucco, etc: Provide sheet metal sleeves with minimum of 112" lip for all exposed locations. Prefinished backed enamel finish on exterior & chrome or painted finish on interior (verify colors with Architect).
C. Root: By metal building supplier, coordinate with same for installation.

2.7 PAINTING OF EQUIPMENT:
A. See Division 09000 for painting standards & requirements, Verify colors with Architect.

PART 3

3.1 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Install equipment & accessories to permit access for maintenance. Relocate items as necessary to provide such access & without cost to the Owner.

C. Examine the areas & conditions under which work of this section will be performed. Correct conditions detrimental to timely & proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

D. Proceed in a timely & proper manner as rapidly as the building construction will permit.

E. Thoroughly clean items before installation.

F. Each contractor (Plumbing, HVAC) shall be responsible to provide & install the required identification, hangers, vibration isolators, flashing, sleeves, motors, access panels & accessories as required for the installation of their systems under their applicable sections.

G. Each Contractor shall be responsible to provide concrete thrust blocks, supports, vaults/pits, condenser pads, etc. as required for equipment under their contract.

3.2 INSTALLATION OF IDENTIFICATION SYSTEMS

A. Pipe: Clamp on legend & arrows, indicating contents of pipe & direction of flow

1. located as follows:
2. Adjacent to each valve.
3. At each branch & riser takeoff.
4. At least once in each area that a pipe passes through (except finished areas) & at least every 40 feet.

B. Valves:

1. Identify valves by distinguishing numbers & letters assigned to them & listed on a valve chart, 2. Attach a brass tag on each valve with 1" to 3/4" #10 Brass-S-Hooks.
3. Furnish 3 copies of printed valve list showing tag letter-number, service, & Location.
4. Include in each maintenance manual.

C. Equipment: Identify equipment with nameplates securely fastened to the equipment. Install nameplates with adhesive or screws. Install metal tags with corrosion resistant metal chains. Install material in accordance with manufacturer's instructions.

3.3 INSTALLATION OF PIPE SUPPORTS

A. Support suspended piping with clevis or trapeze hangers & rods.

B. Space hangers & supports for horizontal steel or PVC pipes according to the following schedule:

Pipe Size:	Maximum Spacing on Centers:
1.25" or smaller	8'-0"
1.5" to 3"	10’-0"
4" or larger	14'-0"

C. Space hangers & supports for horizontal copper tubing according to the following schedule:

Tube Size:	Maximum Spacing on Centers:
1”or smaller	6'-0"
1.5"	7'-0"
8'-0"	2.5"
3”or larger	10'-0"

D. Provide sway bracing on hangers longer than 18". Support vertical piping with riser clamps secured to the piping & resting on the building structure. Provide at each floor unless otherwise noted.

E. Provide insulation continuous through hangers & rollers. Protect insulation by galvanized shields,

F. Arrange pipe supports to prevent excessive deflection, & to avoid excessive bending stress.

G. Support piping from inserts or anchors in concrete slabs. Provide the inserts under this Section.

H. Hub less Piping: Provide hangers on the piping at each side of,& within 6" of, hub less pipe coupling so the coupling will bear no weight. Do not install hangers on couplings. Provide hangers adequate to maintain alignment & to prevent sagging of the pipe. Make adequate provision to prevent shearing & Misting of the pipe & the joint.

3.4 INSTALLATION OF ACCESS BOXES & PANELS

A. Install access boxes or panels as required where piping, valves, equipment, etc. is concealed in walls, floor, or ceilings & will require maintenance or service.

B. Boxes or panels to be flush with surfaces - level, square, & plumb, installed per manufacturer's requirements.

3.5 INSTALLATION OF VIBRATION ISOLATORS

A. Provide isolators at all connections of duct work to equipment (except range hoods),

B. Mount vibrating equipment on "Thy-Curb Vibrocurbs" with a minimum static deflection of 1".

C. Isolate piping from structure in a manner to prevent transmission of vibration.

D. Eliminate the source of any objectionable noise or vibration, or completely isolate it, without cost or inconvenience to the Owner.

E. Provide expansion/contraction joints or fittings to allow perfect freedom of movement of piping during expansion & contraction without budding.

F. Erect piping so the strain & weight does not come upon apparatus.

3.6 INSTALLATION OF SLEEVES & OPENINGS

A. Provide sleeves for each pipe passing through walls, partitions, floors, roofs, & ceilings. Set pipe sleeves in place before concrete is placed. (Alternate method to core drill alter concrete placement).

B. For un-insulated pipe, provide sleeves two pipe sizes larger than the pipe passing through, or provide a minimum of 1/2" clearance between inside & outside of the pipe. For insulated pipe, provide sleeves of adequate size to accommodate the full thickness of pipe covering, with clearance for packing & caulking.

C. Coordinate the caulking of the space between sleeve & pipe, equipment, pipe covering or duct by the fire-proofing contractor, see Division 07000.

D. Caulk the space between sleeve & pipe, equipment, pipe covering or duct, using a noncombustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with combustible material to within 1/2" of both surface faces,,.& provide the waterproof compound described above. See Division 07000 - Firestopping, for requirements & materials. Provide "ProSet" firestop systems for all PVC piping applications.

E. Where items under your contract penetrate the roof, outer walls or waterproofing of any kind, provide under this Section, all base flashing & counter-flashing required at such penetrations.

3.7 TRENCHING & BACKFILLING

A. Perform trenching & backfilling required for work under each section .

B. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the pipe.

C. Bedding & backfilling:

1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
2. Under the building & parking, install pipes on a 6" bed of damp sand. Backfill to bottom of slab or paving with damp sand.
3. Outside the building, install underground piping on a 6' bed of damp sand. Backfill to 12" above pipe with damp sand & backfill remainder with native soil. Tamp in firmly in lifts to achieve uniform compaction.
4. Do not backfill until installation has been approved & until Project Record Documents have been properly annotated.

3.8 FIELD QUALITY CONTROL

A. Upon completion of the project, provide the Architect/Engineer with a certification that the installation has been inspected for proper operation & that it complies with all applicable codes.

3.9 PROJECT CLOSE OUT

A.. Upon completion of the plumbing installation and before final payment is made, the plumbing contractor will provide to the owner (2) two completed sets of as-built drawings detailing and showing *any* deviation from the contract documents, submittals(if different from original submittal), and any instruction / maintenance manuals supplied by manufacturer with equipment used on the project.

1. It will be the responsibility of the plumbing contractor to provide all of the above from any sub-contractor that competes any work on the project under their contract.

END OF SECTION

SECTION 15400

PLUMBING

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Section 15050-Basic Material & Methods
  1. Pipe and pipe fittings, valves
  2. Plumbing Specialties: Floor drains, interceptors, cleanouts, backflow preventers, water hammer arrestors, hose bibs/hydrants.
  3. Plumbing Fixtures & Equipment

1.2 SUBMITTALS
- A. Product Data: For review provide manufacturers literature for plumbing specialties, fixtures, and equipment.
- B. Operation & Maintenance Instructions: Comply with Division 01000. Include within each manual a copy of the Project Record Documents showing all work of this Section. Include relevant instructions & data.

1.3 QUALITY ASSURANCE
- A. Testing & Adjusting: Test pipe installation as indicated, & obtain Architects inspection & approval of installation prior to burial or concealment by further construction.
- B. Sterilization Certificate: Upon completion of water line sterilization, deliver to the Architect two (2) copies of an acceptable "Certificate of Performance" for that activity.
- C. Cathodic Protection: Upon completion of the work of this Section, deliver to the Architect sufficient data to prove that wrapping of steel piping has been tested & meets the specified requirements. Show date of inspection, voltages used, & name & address of the inspector.

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPING, BURIED BEYOND BUILDING
- A. PVC Pipe: ASTM D3033 or D3034, SDR 35, with elastomeric gaskets.

2.2 SANITARY SEWER PIPING, BURIED UNDER & ABOVE GRADE, WITHIN BUILDING
- A. PVC Pipe: ASTM D2729 with solvent weld joints, Schedule 40 PVC.

2.3 WATER PIPING, BURIED BEYOND BUILDING
- A. Copper Tubing: ASTM B88, Type K, or ASTM B42, annealed with wrought copper fittings and compression joints:
- B. PVC Pipe: AWWA C902, or ASTM D1785, Schedule 40, or ASTM D2241, minimum 150 psig pressure rating with solvent weld joints.

2.4 WATER PIPING, BURIED UNDER BUILDING
- A. Copper Tubing: ASTM B88, Type K, annealed without fittings.

2.5 WATER PIPING, ABOVE GRADE
- A. Copper Tubing: ASTM B88, Type L, hard drawn, with cast brass or wrought copper fittings and Grade 95TA solder joints.

2.6 NOT USED

2.7 NATURAL GAS PIPING, BURIED
- A. Steel Pipe: ASTM A53, Schedule 40 black with polyethylene jacket and welded joints.

2.8 NATURAL GAS PIPING, ABOVE GRADE
- A. Steel Pipe: ASTM A53 or A120, Schedule 40 black (galvanized where exposed to weather), with malleable iron or forged steel fittings, screwed or welded.

2.9 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 2 inches and Under: malleable iron unions for threaded ferrous piping; bronze unions for Soldered copper pipe joints.

B. Pipe Size Over 2 inches: forged steel flanges for ferrous piping; bronze flanges for copper piping; Neoprene gaskets.

C. Grooved and Shouldered Pipe End Couplings: Malleable iron housing; "C" shape composition sealing gasket; steel bolts, nuts, and washers.

D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.10 GATE VALVES

A. Up to 2 inches: Bronze body, non-rising stem & hand wheel, inside screw, single wedge or disc, solder or threaded ends.

B. Over 2 inches: Iron body, bronze trim, rising stem & hand wheel, OS & Y, single wedge, flanged or grooved ends.

2.11 GLOBE VALVES

A. Up to 2 Inches: Bronze body, rising stem and hand wheel, inside screw, renewable composition disc, solder or screwed ends, with back seating capacity.

B. Over 2 Inches: Iron body, bronze trim, rising stem & hand wheel, OS & Y, plug-type disc, flanged ends.

2.12 BALL VALVES

A. Up to 2 Inches: Bronze or stainless steel body, stainless steel ball, Teflon seats and stuffing box ring, lever handle, solder or threaded ends.

B. Over 2 Inches: Cast steel body, chrome plated steel ball, Teflon seat and stuffing box seals, lever handle, flanged.

2.13 PLUG VALVES or GAS COCKS

A. Up to 2 Inches: Bronze body, bronze tapered plug, non-lubricated Teflon packing, threaded ends. B. Over 2 Inches: Cast iron body and plug, non-lubricated, Teflon packing, flanged ends.

2.14 WATER PRESSURE REDUCING VALVES

A. Up to 2 Inches: Bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded and single or double union ends.

B. Over 2 inches: Cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

2.15 RELIEF VALVES

A. Bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

2.16 FLOOR DRAINS

A. See plans for Manufacturer:
Equal Zurn ZN-415 floor & Shower drain, Dura-Coated cast iron body with bottom outlet, combination invertible membrane clamp & adjustable type B polished bronze strainer. Install with standard P-trap & in size as noted on plans.

B, At all slab on grade locations install backwater valve to equal a Zurn Z-199.

C. At all location where an equipment condensate drain DOES NOT run into floor drain install automatic trap primer to equal a Zurn Z-1022 automatic trap primer & Z-1023 trap primer connector.

2.17 GREASE INTERCEPTORS

A. If required and subject to the authority having jurisdiction, provide interceptor of size, capacity, and details as shown on plans

2.18 CLEANOUTS

A. Floor: Lacquered cast iron, two piece body with double drainage flange, weep holes, reversible clamping collar, and adjustable nickel-bronze strainer, round scoriated cover in service areas and round or square depressed cover to accept floor finish in finished floor areas.

B. Wall: Line type with lacquered cast iron body and round epoxy coated gasketted cover, and round stainless steel access cover secured with machine screw.
C. Cover plates: heavy polished stainless steel, wall & floor cover plates, installed flush with floor or wall, with adjustable watertight covers in floors & round chrome plated or stainless steel access plate & screw in walls.
D. Cleanout plugs of extra heavy bronze.
E. All exterior cover plates & cleanouts to have stainless steel screws.

2.19 BACKFLOW PREVENTORS
A. Subject to the compliance with design and Authority Having Jurisdiction requirements, provide double check type assembly, equal to Ames 2000SS

2.20 WATER HAMMER ARRESTERS
A. Type to be PDI WH-201, pre-charged suitable for operation in temperature range from 100 to 300' F & maximum 250 psig working pressure.

2.21 HOSE BIBS/HYDRANTS
A. See plans Manufacturers & Model numbers.
B. Interior Hose Bib: Bronze or brass, replaceable hexagonal disc, hose thread spout, chrome plated with vacuum breaker.
C. Wall Hydrant: Non-freeze, anti-siphon, automatic self-draining type with chrome plated with wall plate hose thread spout, [removable key], and vacuum breaker.

2.22 SCHEDULED EQUIPMENT ON PLANS
A. See Plans for list of equipment

2.23 WATER HEATERS
A. See plans for Manufacturers & Models.
B. Maximum working pressure: 150 psig

2.24 PIPE & VALVE INSULATION
A. Glass Fiber Insulation: ANSI/ASTM C547;1" to 3" thick Owens/Corning fiberglass, noncombustible insulation, 3 lb. density, "25 ASJKISSL-11" for Hot & Cold Water lines.
B. Cellular Foam: Flexible, plastic; 1/2" Armstrong 'Armaflex sealed with Armstrong adhesive for condensate lines above ceilings or concealed in walls.
C. Jacket:
    1. Vapor Barrier Jackets: Factory applied fiberglass reinforced vinyl 25ASJ vapor barrier with self-sealing adhesive joints.
    2. PVC Jackets: One piece, pre-molded type, Manville "Zeston 25150"
D. Accessories;
    1. Insulation bands: 314" wide, galvanized steel.
    2. Fibrous Glass Cloth: Untreated; 9 oz/sq.yd. weight.
E. Safety Insulation: Equal "Handy Shield" foam insulated, vinyl jacked recloseable protective covers.

PART 3 EXECUTION

3.1 PREPARATION.
A. Ream pipe and tube ends. Remove burrs.
B. Remove scale and dirt, on inside and outside piping before assembly.
C. Prepare piping connections to equipment with flanges or unions.
D. Coordinate cutting or forming of roof or floor construction to receive drains to required invert elevations.
E. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
D. Verify adjacent construction is ready to receive rough-in work of this Section.
E. Examine the areas & conditions under which work of this section will be performed. Correct conditions detrimental to timely & proper completion of the work. Do not proceed until unsatisfactory conditions are corrected,

F. Thoroughly clean items before installation.
G. Examine the areas & conditions under which work of this sections will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
H. Thoroughly clean items before installation.

3.2 INSTALLATION

A, Proceed as rapidly as the building construction will permit.
B. Provide dielectric connections wherever jointing dissimilar metals.
C. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations.
D. Install piping to arrow for expansion and contraction without stressing pipe, joints, or connected equipment.
E. Provide clearance for installation of insulation and access to valves and fittings.
F. Slope water piping and arrange to drain at *low* points.
G. install under slab water piping without joints. ,
H. Install bell and spigot pipe with bell end upstream.
I. Install specialties in accordance with manufacturer's instructions.
J. Cut square, remove burrs, & clean inside of female copper tubing, filing to a bright finish. Apply solder flux with brush to tubing. Remove internal parts of solder-end valves prior to soldering.
K. Soil piping shall be graded a minimum of 1/8" per foot & a maximum of 112" per foot in the direction of flow.
L. Cutting & Patching: Provide cutting, patching, hangers, foundation openings & bucks, including cutting & patching of concrete, brick, paving, & curbs.
M. Install Los Angeles pattern cast brass traps with brass nuts (chrome plated) for lavatories & sinks, except service sinks.
N. Install all water piping within the building insulation envelope. No piping is to be on the cold side of the vapor barrier or in unheated attic spaces. Keep all piping concealed in walls, mechanical chases & spaces. Plumbing contractor to coordinate work with Insulation contractor to assure location of insulation envelope. The Architect shall promptly be notified of any difficulties in accomplishing this. Any deviations from this will be grounds for rejecting work.
O. Minimum size of all waste, drain, and vent lines under slab shall be as follows: See plans for underslab pipe sizes.
P. Install water heaters in accordance with manufacturer's instructions and to AGA, NSF, NFPA, & UL requirements. Coordinate with plumbing piping and related fuel piping, gas venting, or electrical work to achieve operating system.
Q. Layout the plumbing system in careful coordination with the drawings, determining proper elevations for all components of the system & using only the minimum number of bends to produce a satisfactory functioning system,
R. Layout pipes to fall within partition, wall or roof cavities, & to not require furring other than as shown on the drawings.
S. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
T. Make changes in directions with fittings, make changes in mains sizes with eccentric reducing fittings. Unless otherwise noted, install water supply & return piping with straight side of eccentric fittings at top of the pipe.
U. Screwed piping joints de-burr cuts & treads to requirements of ANSI B2.1. Do not ream exceeding internal diameter of the pipe. Use tenon tape on mate thread prior to joining other services.
V. Remake leaky joints with new material, removing leaking section and/or fitting as directed. Do not use thread cement or sealant to tighten joint.

3.4 APPLICATION

A. Use grooved mechanical couplings and fasteners, and dielectric connections only in accessible locations.
B. Install unions downstream of valves and at equipment or apparatus connections.
C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
D. Install pressure regulators as required for each system or piece of equipment on all air, gas & water service.
E. Install piping, equipment, & accessories to permit access for maintenance. Relocate items as necessary to provide such access & without cost to the Owner.

F, Provide access doors where valves, motors, or equipment requiring access for maintenance are located in walls or chases above ceilings. Coordinate location of access doors with other trades as required.

3.5 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide new gas service & coordinate with Gas Service Company the installation of gas meter and regulators. Gas service distribution piping to have initial minimum pressure of 7" wg (4oz). Provide regulators as required on each line serving gravity type appliances, sized in accordance with equipment.

3.6 INSTALLATION OF PLUMBING FIXTURES

A. Set fixtures level and in proper alignment with respect to walls & floors, and with fixtures equally spaced.

B. Install each fixture with chrome plated rigid or flexible supplies in proper alignment with fixtures & with each other, & with screwdriver stops, reducers, & escutcheons.

C. Install flush valves in alignment with the fixture, without vertical or horizontal offsets.

D. Grout or caulk wall and floor mounted fixtures watertight where the fixtures are in contact with walls & floors.

E. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self rimming sinks installed in casework.

F, Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

G. Cap pipe openings to exclude contaminants (dirt, bugs, etc.) until fixtures are installed & final connections made.

3.7 INSTALLATION OF FINISH & ESCUTCHEONS

A. Smooth up rough edges around sleeves with plaster or spackling compound.

B. Provide 1" wide chrome or nickel plated escutcheons on all pipes exposed to view where passing through walls, floors, partitions, ceilings & similar locations. Size The escutcheons to fit pipe & coverings. Hold escutcheons in place with set screw.

3.8 INSTALLATION OF VALVES

A. Provide valves in water, air & gas systems. Locate & arrange so as to give complete regulation of apparatus, equipment, & fixtures. Locate valves for easy accessibility & maintenance.

B. Provide valves in at least the following locations:

1 In branches & for headers of water piping serving a group of fixtures.

2. On both sides of apparatus & equipment.

3. For shutoff of risers & branch mains.

4. For flushing & sterilizing the system.

5. Where shown on plans.

C. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install globe, ball or butterfly valves for throttling, bypass, or manual flow control services.

3.9 INSTALLATION OF PIPING INSULATION

A. Install materials in accordance with manufacturer's instructions.

B. Maintain ambient temperatures & conditions required by manufacturers of adhesive & insulation.

C. Continue insulation vapor barrier through penetrations.

D. Piping Insulation:

1. Locate insulation & cover seams in least visible places.

2. Neatly finish insulation at supports, protrusions, & interruptions.

3.. Insulation with Vapor Barrier: Insulate fittings, valves, unions, flanges. strainers. flexible connections, & expansion joints.

4. Insulation without Vapor Barrier: Bevel & seal ends of insulation at equipment, flanges, & unions.

5. Provide insert between support shield & piping, under the finish jacket, on piping 2' diameter or larger. Fabricate of cork or other heavy density insulating material suitable for temperature, not less than 6" long, of same thickness & contour as adjoining insulation.

6. Insulate all hot & cold water supply & return lines with glass fiber with thickness as follows: 1"eor less with 1', 1.25' to 4"e with 1.5", & greater than 4"e with 2'. Insulate condensate lines above ceilings or concealed in walls with cellular foam.

7. Insulate all exposed drain & supply lines exposed under wall hung fixtures & lavatories with safety insulation to meet ANSI A177 & ADA codes for protection & accessibility of physically handicapped persons.

E. Pipe Insulation Jackets:
1. Indoor, Concealed Hot Pipes: Furnish standard factory applied jackets with or without vapor barrier. Finish fittings, joints, & valves with glass cloth & adhesive. PVC jackets may be used.
2. Indoor, Concealed Cold Pipes: Furnish with vapor barrier jackets, factory applied. Furnish fittings, joints, & valves with glass cloth & vapor barrier adhesive.
3. Indoor, Exposed Pipes: Finish with PVC jackets.

3.10 INSTALLATION OF CLEANOUTS

A. Secure the Architect's approval of locations for cleanouts in finished areas prior to installation. Locate at intervals of not more than 100 feet.
B. Provide cleanouts of same nominal size as the pipes they serve, except where cleanouts are required in pipes 4" & larger provide 4" cleanouts unless otherwise noted.
C. Make cleanouts accessible & ensure clearance at cleanout for rodding of drainage system.
D. Extend cleanouts to finished floor or wail surface & provide cover plates as required.
E. After pressure testing thoroughly lubricate threaded cleanout plugs with mixture of graphite and linseed oil.
F. Provide exterior cleanouts with stainless steel screws and set in 4" thick concrete poured 12" around all sides, flush with finish grade.

3.11 INSTALLATION OF WATER HAMMER ARRESTERS

A. Provide water hammer arresters on hot & cold water lines.
B. Install in upright position at all quick closing valves, solenoids, isolated plumbing fixtures, & supply headers at plumbing fixture groups. install water hammer arresters behind access panels.
C. Locate & size as specified or as shown on the Drawings, & where not shown locate in accordance with Plumbing & Drainage Institute Standard WH-201. Locate water hammer arrestors on all flushometer valves, showers, shower/tubs, sinks, & electronic solenoid valves.
D. Where fixtures are not protected by water hammer arresters, provide 24" high air chambers on each water supply, properly sized & designed for maintenance & drainage.
E. Install water hammer arrestors complete with accessible isolation valve.

3.12 INSTALLATION OF BACKFLOW PREVENTION

A. Protect plumbing fixtures, faucets with hose connections, & other equipment having plumbing connection, against possible back-siphonage.
B. Arrange testing of backflow devices as required by the governmental agencies having jurisdiction. Provide both the Owner & Architect of a copy of test & approval.
C. Install backflow preventers to meet the Safe Drinking Water & Public Drinking Water Regulations as required by the State.

3.13 DISINFECTION STERILIZATION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starling work, verify system is complete, flush & clean. Notify the Architect at least 48 hours prior to start of the disinfection process & perform disinfection process under Architect's observation. Ensure PH of water to be treated is between 7A & 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric),
B. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form, throughout system to obtain 50 to 80 mg/L residual. Bleed water from outlets to ensure distribution.
C. Maintain disinfectant in system for 24 hours. If final disinfectant residual test less than 25 mg/L, repeat treatment.
D. Flush disinfectant from system. Take samples no sooner than 24 hours after flushing, & analyze in accordance with AWWA C601.
E. Upon completion of sterilization, & 24 hours after final flushing, secure an analysis by a laboratory approved by the Architect, based on water samples from the system, showing lest negative for colt-aerogene organisms. Provide a total plate count of Jess than 100 bacteria per cc, or equal to the control sample. Take a minimum of 4 samples from the building system as remote from each other as possible.

F. Upon completion of sterilization, secure & submit a Certificate of Performance required under Article 1.4 of this Section, stating system capacity, disinfectant used, time & rate of disinfectant applied, & resultant residuals in ppm at completion. Also give the results of coli-aerogene tests.

G. If analysis results are not satisfactory, repeat the disinfection procedures & retest until specified standards are achieved.

3.14 FIELD QUALITY CONTROL

A. Upon completion of the plumbing installation the plumbing contractor shall provide the Architect/Engineer with the certifications that the installation has been inspected for proper operation & that it complies with all applicable codes including the BOCA National Plumbing Code.

B. Plumbing system including, but not limited to, plumbing fixtures & trim, water piping (supply & DWV), etc. shall be tested & inspected.

C. Plumbing Contractor shall submit the following:

1 Sterilization Certificate per 1.04 of this Section

2. Plumbing Certificate of Performance

3. Certification of Backflow Prevention devices by state certified tester,

4. As built/record drawings of actual installation to the Architect after completion of the project.

D, Testing & Adjusting

1. Temporary plug waste, vent, & root drain lines fill with water to the roof level, & allow to remain so for 24 hours without leakage,

2. Test hot & cold water lines at 125 psi for a period of 12 hours without leaking.

3. On all piping systems, a final test shall be made upon completion of system piping. The test pressure shall be the maximum operating pressure of the system. No leaks shall be detected. Comply with all local codes & ordinances & make all tests required by governing bodies.

E. Where tests show material or workmanship to be deficient, replace or repair as necessary, & repeat the tests until the specified standards are achieved.

F. Adjust systems to optimum standards of operation.

END OF SECTION

SECTION 15600

FURNACES, RADIANT TUBE & CONDENSING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Section 15050. Basic Materials & Methods
- B. Forced air furnaces
- C. Refrigerant cooling coils and condensing units
- D. Radiant Tube Heaters

1.2 SUBMITTALS
- A. Shop Drawings: Indicate dimensions, connections, arrangement, accessories and controls
- B. Product Data: Provide manufacturer's installation instructions.
- C. Operating and Maintenance Instructions: Include relevant instructions
  1. Provide (1) one onsite training session and (2) complete sets of written instructions to the owner for operation and maintenance of all equipment used on the project.
     a. All equipment must be operational before onsite training takes place.
- D. Provide a set digital pictures on a CD for the owners record of all under-slab and in wall work after inspection by the building inspector having jurisdiction over the project and before backfill and/or wall materials are installed.(applies to all work hidden and unable to view at projects completion)
  1. Supply pictures of the type and minimum quality listed below.
     a. JPEG image, 5 mega pixel or better set to the largest format possible.
     b. Image must clearly show all items that will be hidden from view when project is completed. Pictures taken with a telephone camera will not be accepted
     c. Pictures must be original pictures unedited, cropped or altered in any way.
  2. Supply a legend for the pictures to clarify the date, location, direction and/or wall in which the picture was taken.
  3. Submittal of these pictures to be part of project closeout 15600, 3.4

1.3 WARRANTY
- A. Provide (1) one year manufacturer's warranty under provisions of Division 01000, Including, a 20 year coverage for heat exchangers.
- B. Provide one year manufacturer's warranty under provisions of Division 010000 including 5 year coverage for refrigeration compressors.
- C. Radiant tube heaters: 1 year for components, 5-years for tubes and 10 years for burner.

PART 2 PRODUCTS

2.1 CONTROLS
- A. Units shaft have required operating controls, starters, motor over- load protection & safety controls.
- B. Thermostats: Programmable features - two separate temperatures per 24 hours & seven day programmable feature with touch screen operation.
- C. System Control: Heat, Off, Cool
  1. Fan Control: Automatic, On
  2. 24V Transformer (6VA Load), WhiteRogers IF95-1280, & battery backup.

2.2 FORCED AIR FURNACES
- A. Type: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heat exchanger, burner, controls, air filter, 40•VA transformer, humidifier, refrigerant cooling coil and outdoor package containing compressor, condenser coil and condenser fan. Up, Counter, or Horizontal flow with gas burner and electric refrigeration.
- B. Heating & Cooling Performance: See plans for outputs, performance & model numbers,
- C. Heat Exchanger: Primary - Stainless steel, welded construction, Secondary - laminated polyrproylene steel.
- D. Combustion Chamber: Welded stainless steel.
- E. Supply Fan: Centrifugal type, rubber mounted with direct drive with multispeed motor.

F. Air Filters: One inch thick grass fiber disposable type.
G. Gas Burner: Induced combustion type with combination gas valve and pressure regulator, manual shut-off, pilot valve, electronic pilot ignition, thermocouple pilot safety device, & 100% outdoor combustion air. A.G.A. design certified.
H. Burner Operating Controls: Low voltage, adjustable room thermostat controls burner via printed circuit board control in furnace; high limit control with fixed stop de-energizes burner on high bonnet temperature. Control supply fan in accordance with bonnet temperature. Include manual switch for continuous operation.
I. Evaporator Coil: Copper tube aluminum fin coil assembly, with one piece molded high-impact plastic drain pan, drain connection, refrigerant piping connections, and factory installed thermostatic expansion valve,
J. PVC schedule 40 vent & combustion piping for gas-fired condensing furnaces.

2.3 RADIANT TUBE HEATERS
A. Low intensity, infra-red, two-stage tube type heaters, equal to Detroit Radiant
1. Black coated aluminized or titanium combustion chamber and radiant tubes
2. CSA, IAS and CE certification
3. Hot surface ignition, flame rod sense, self diagnostic LED.
4. Controls to have pre & post purge, 24V thermostat and micro-processor circuitry.
1. Supply two stage touch screen thermostat with each unit.
B. See plans for models and sizes.
C. Install and vent per manufacturer's standard through the wall venting specifications.

2.4 CONDENSING UNITS
A. See plans for Manufacturer, Model, sizes, & performance.
B. Units: Self-contained, split system package factory assembled & pre-wired units for outdoor installation & condensing of cabinet, compressors, condensing coil & fans, integral sub-cooling coil, controls, & liquid line receiver.
C. Cabinet: Galvanized steel with baked enamel finish & removable access door or panels with quick fasteners.
D. Compressor: Hermetic, 1750 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and filter drier.
1. Use R-410a
E. Air Cooled Condenser: Aluminum fin seamless copper tube coil, direct drive vertical discharge propeller fan resiliently mounted, galvanized fan guard, permanently lubricated ball bearing motors built-in current & overload protection.
F. Controls: High & low pressure cutouts for compressor, oil pressure control, non-recycling pump down & reset relay. Provide low ambient controls to permit operation down to 35F ambient temperature. Provide timer circuits, to prevent rapid loading & unloading of compressor.

2.5 FLUE SYSTEMS
A. For gas equipment exhaust per manufacturer's specifications.
B. For gas equipment exhausts up to 1000F continuous/1400F intermittent use double wall construction with 0.035" stainless steel interior & 0.025" aluminum external skin under positive pressure, Equal Selkirk Metalbestos model PC vent pipe.
C. Flue systems to include all piping, breeching, support brackets, fire stops, terminators, caps, attic insulation shields, etc. for complete system. All component parts to be Metalbestos recommended use for the type of flue system.
1. Vent all gas fired tube heaters per manufacturer's through the wall specifications.
D. For condensing furnaces use PVC schedule 40 vent & combustion piping.
E. For instantaneous water heaters provide vent pipe as recommended by the water heater manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION
A. Install equipment & specialties in accordance with manufacturer's instructions.
B. Mount air cooled condenser package on concrete pad. Install exterior concrete equipment pads for condensing units.
C. Tough-up scratches & abrasions to be invisible to the unaided eye from a distance of 5'-0".
D. Provide for connection to electrical service. Refer to Division 16000.

E. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient. Install piping to conserve building space, and not interfere with use of space and other work. Group piping whenever practical at common elevations. Conceal piping in walls, mechanical rooms, or attic spaces.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance for installation of insulation, and access to valves and fittings. Provide non-conducting dieleclrical connections when joining dissimilar metals. Pressure lest system with dry nitrogen to 200 psig. Perform final test at 27" vacuum and 200 psig. Test to no leakage.

H. Charge system with refrigerant & put into operation, test equipment performance. Provide cooling season start-up & healing season shut-down for first year of operation.

I. Do not operate fans until ductwork is clean, niters are inn place, bearings lubricated, & fans have been lest run under observation.

J. Where piping, flues, ductwork etc. pass from heated spaces into non-heated spaces (attics, outside, etc.) all openings must be caulked & made airtight around penetrations. Provide metal fire stops on sheet metal flues rather than caulk.

K. Caulk around all piping, flues, ductwork, etc. that pass through fire-rated assemblies (walls, ceilings, etc.) using a non-combustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finish appearance. See Division 07000 - Firestopping, for requirements & materials.

3.2 APPLICATION

A. Provide line size liquid indicators in main liquid line leaving condenser, or if receiver is provided, in liquid line leaving receiver.

B. Provide refrigerant charging valve connections in liquid line between receiver shut-off valve & expansion valve.

C. Utilize flexible connectors at or near compressors where piping configuration does not absorb vibration.

D. Provide vent terminal kits for vent & combustion air for each condensing furnace installed per manufacturer’s instructions.

E. Verify electrical service characteristics before ordering equipment.

F. Air handling units to be mounted within 112" of level, for proper condensate drainage. The condensate drainage is NOT to be externally trapped (drain assembly is internally trapped). On condensing furnaces the condensate drain can NOT be run to exterior of building it must be internally plumbed,

G. Verify physical size of equipment to fit in space provided with space allowed for service prior to ordering equipment.

H. Where items of this Section penetrate roof, outer wails, or waterproofing of any kind, provide under this Section, all base flashing & counterflashing required at such penetration.

I. Systems to balanced per Section 15990 - once for heating season & once for cooling season, must be balanced twice within the first year. Owner to be instructed on different settings for each season.

3.3 FIELD QUALITY CONTROL & INSTRUCTIONS

A. Upon completion of this portion of the Work, & prior to its acceptance by the Owner, provide a qualified engineer & fully instruct the Owner's maintenance personnel in the proper operation & maintenance of all items provided under this Section.

B. Demonstrate the contents of the approved operation & maintenance manual required under this Section.

C. Upon completion of the HVAC system installation, the HVAC contractor shall provide the Architect/Engineer with certification that the installation has been inspected for proper operation & that it complies with all applicable codes.

D. The HVAC contactor shall submit the following:
   1. HVAC Certificate of Performance
   2. Air Flow test results per Section 15990
   3. As-build/record drawings to the Architect of completed systems.

3.4 PROJECT CLOSE OUT

A.. Upon completion of mechanical/HVAC installation and before final payment is made, the mechanical/HVAC contractor will provide to the owner (2) two completed sets of as-built drawings detailing and showing ***any*** deviation from the contract documents, submittals(if different from original submittal), and any instruction/maintenance manuals supplied by manufacturer with equipment used on the project.

1. It will be the responsibility of the mechanical/HVAC contractor to provide all of the above from any sub-contractor that competes any work on the project under their contract.

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END OF SECTION

SECTION 15880

AIR DISTRIBUTION

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Section 15050, Basic Materials & Methods
- B. Filters.
- C. Ductwork & ductwork accessories.
- D. Volume control dampers.
- E. Fire dampers,
- F. Flexible duct connections.
- G. Diffusers, boots, registers, grilles.
- H. Louvers & roof hoods.
- I. Exhaust Fans

1.2 SUBMITTALS
- A. Shop Drawings: Indicate for manufactured products & assemblies, & include electrical characteristics & connection requirements.
- B. Product Data: Provide for manufactured products & assemblies, & include electrical characteristics & connection requirements.
- C. Operating & Maintenance Instructions: Include instructions for lubrication, filter replacement, spare parts lists, & wiring diagrams.

PART 2 PRODUCTS

2.1 FILTERS
- A. Washable Permanent Panel Filters: 14 mesh steel screen, zinc electroplated, stainless steel, or aluminum, rod reinforced; enclosed in galvanized steel or stainless steel frame. Size as required with thickness of 112 inch to one inch.
- B. Disposable. Panel Filters: Fiber blanket, factory sprayed with flameproof, non-drip, non-volatile adhesive. Size as required with 1" thickness set in casing of cardboard frame with perforated metal or plastic retainer. Galvanized steel frame with expanded metal grid on outlet side & steel rod grid on inlet side required on filter larger than 30"x30". Performance Rating to be 500 FPM face velocity.

2,2 DUCTWORK
- A. Materials
  1. Steel Ducts: Galvanized steel sheet, lock-forming quality.
  2. Insulated Flexible Ducts: Flexible duct wrapped with flexible 1" thick glass fiber insulation, enclosed by seamless vapor barrier jacket.
  3. Stainless Steel: 0.043' (18MSG) thickness, unlined for range hood exhaust systems, lock forming quality, & watertight construction for dishwasher hoods.
  4. Sealant: Non-hardening, water resistant, fire resistive, used alone or with tape.
- B. Metal Ductwork
  1. Fabricate & support in accordance with SMACNA HVAC Duct Construction Standards - Metal & Flexible except as indicated.
  2. Construct T's, bends, & elbows with radius of 1-112 times width of duct on center line. Where not possible provide turning vanes.
  3. Increase duct sizes gradually, not exceeding 30 degrees divergence & 45 degrees convergence.
  4. Connect flexible ducts to metal ducts with liquid adhesive plus tape or adhesive plus sheet metal screws.
  5. Use crimp joints with or without bead for joining round duct sizes 8 inch & smaller with crimp in direction of air flow.

2.3 VOLUME CONTROL DAMPERS.
- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal & Flexible, & as indicated.

B. Fabricate splitter dampers of material same gage as duct to 24 inches size in either direction, & two gages heavier for larger sizes. Secure with continuous hinge or rod. Operate with minimum 1/4 inch diameter rod.
C. Fabricate single blade dampers for duct sizes to 12 x 30 inch.
D. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72 inch. Assemble center & edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
E. Except in round ductwork 12 inches & smaller, provide end bearings.
F. Provide locking, indicating quadrant regulators on single & multi-blade dampers. Where width exceeds 30 inches provide regulator at both ends.

2.4 FIRE & SMOKE DAMPERS

A. All fire dampers must be dynamic rated & fabricated in accordance to meet UL-55 & Jor NFPA-90A, & as indicated.
B. Equal these Manufacturers:
   1. Ruskin, Model IBD2 style A,B, or C (interlocking blade fire damper).
   2. Greenheck, Model DFD-150 (less than 3 hour rated barriers).
   3. Greenheck, Model DFD-350 (3 or more hour rated barriers).
   4. Ruskin, Model FSD35 with 120V actuator (combination fire & smoke).
   5. Safe-Air 'Thermo/Guard', Model A240R(Combination fire & volume control).
C. Fabricate curtain type dampers with blades out of air stream except for 1.0 inch pressure class ducts up to 12 inches in height.

2.5 BACKDRAFT DAMPERS.

A. Gravity back draft dampers, size 18 x 18 inches or smaller, furnished with air moving equipment, may be air moving equipment manufacturers standard construction.
B. Fabricate multi-blade, parallel action gravity balanced back draft dampers of galvanized steel, or extruded aluminum, with center pivoted blades, with seated edges, linked together, steel bail bearings, & plated steel pivot pin.

2.6 AIR TURNING DEVICES/EXTRACTORS

A. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.
B. Multi-blade device with radius blades attached to pivoting frame & bracket, steel or aluminum construction, with push-pull operator strap.

2.7 FLEXIBLE DUCT CONNECTIONS

A. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, approximately 3 inches wide, crimped into metal edging strip.

2.8 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal & Flexible Ducts
B. Access doors smaller than 12 inches square may be secured with sash locks.
C. Access doors with sheet metal screw fasteners are not acceptable.

2.9 AIR OUTLETS & INLETS

A. Equal these Manufacturers:
   1. Anemostat
   2. Hart & Cooley
   3. J & J Register
   4. Krueger
   5. Tuttle & Bailey
   6. Carnes
   7. Lima
   6. Metalaire
   9. Price Industries
B. Ceiling Diffusers: Round or Rectangular adjustable pattern, stamped or spun, multi-core type diffuser to discharge air with sectorizing baffles where indicated; radial opposed blade damper & equalizing grid; baked enamel off-white finish.
C. Modified Light Troffer Diffusers: Single or Double plenum type constructed of galvanized steel with welded or soldered joints & finish matte black inside, with volume & pattern controllers, 5 inch round or oval top or side air inlet.
D. Registers/Grilles: Streamlined & individually adjustable blades, with baked enamel off-white finish.

E. Exterior Louvers: Weatherproof & minimum 4 inches deep with blades on 45 degree slope, heavy channel frame, bird screen with 1/2 inch square mesh for exhaust & 3/4 inch for intake.
   1. Material; 12 gage thick extruded aluminum.
   2. Finish: Factory anodized finish to match adjacent surfaces, verify color with Architect/Engineer.

2.10 DUCTWORK INSULATION

A. Flexible Glass Fiber: ASTM C612; flexible, non-combustible blanket, 'K' Value of 0.29 at 75°F, Density of 1.5 (bleu ft, & Vapor Barrier Jacket of Kraft paper reinforced with glass fiber yam & bonded to, aluminized film, secured with pressure sensitive tape.

B. Rigid Glass Fiber: ASTM C612; rigid, noncombustible blanket, 'K' Value of 0,29 at 75°F, Density of 2.0lb/cu ft, & Vapor Barrier Jacket of Kraft paper reinforced with glass fiber yarn & bonded to aluminized film, secured with pressure sensitive tape.

C. Canvas Jacket: UL listed fabric, 6 oz/sq yd ,plain weave cotton treated with dilute fire retardant lagging adhesive.

D. Duct Liner; ASTM C553; flexible, noncombustible blanket, 'K' Value of ASTM C518, 0.28 at 75°F, Density of 1.5 Iblcu ft, Maximum Velocity on Coated Air Side: 6,000 ft/min, use waterproof fire retardant type Adhesive, with Liner Fasteners of galvanized steel, self adhesive pad or welded with press on head.

2.12 CABINET EXHAUST FANS

A. See plans for Manufacturers, Model, Accessories & Performance.

B. Centrifugal Fan Unit: V-belt driven with galvanized steel cabinet

C. See plans for Electrical Characteristics & Components.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install fans on vibration isolators.

C. Provide drain pans & down spouts for cooling coil banks more than one coil high. Provide eliminators mounted over drain pan.

D. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, & fan has been test run under observation.

E. Install fans with resilient mountings & flexible electrical leads. Install flexible connections specified between fan inlet & discharge ductwork. Flexible connectors shall no! be in tension while running.

F. Provide fixed sheaves required for final air balance.

G. Provide safety screen where tan inlet or outlet is exposed.

H. Provide back draft dampers on discharge of exhaust fans & as indicated.

I. Install flexible connections specified between fan inlet & discharge ductwork, Flexible connectors shall not be in tension while running.

J. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.

K. Install filter gage static pressure tips upstream & downstream of filters. Mount filter gages on outside of filter housing or filter plenum, in accessible position. Adjust & level.

L. Provide openings in ductwork where required to accommodate thermometers & controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage.

M. Locate ducts with sufficient space around equipment to allow normal operating & maintenance activities.

N. Connect diffusers or troffer boots to low pressure ducts with 5 feet maximum length of flexible duct, Hold in place with strap or clamp.

O. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

P. Provide fire dampers at locations indicated. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings & hinges.

Q. Provide vent-fabric flexible connections immediately adjacent to equipment in ducts associated with fans & motorized equipment, of minimum 6' full length.

R. Provide duct access doors for inspection & cleaning before & after filters, coils, fans, automatic dampers, at fire dampers, & elsewhere as indicated.

S. Provide minimum B x 8 inch size for hand access, 18 x 18 inch size for shoulder access.

T. Check location of air outlets & inlets & make necessary adjustments in position to conform with architectural features, symmetry, & lighting arrangement.

U. Provide balancing dampers on duct take-off to diffusers,& grilles & registers, regardless of whether dampers are specified as part of the diffuser, or grille & register assembly. Also provide manual dampers on Fresh Air (FA) ducts at connection to Return Air (RA) ducts to balance F.A. from 0 to 100% of duct cap.

V. Paint ductwork visible behind air outlets & inlets matte black. Refer to Division 09000.Connect branch take-offs to include prefabricated air scoops or air take-offs formed of galvanized sheet metal. Provide operating handles when required.

32 INSTALLATION OF DUCTWORK INSULATION

A. Provide insulation with vapor barrier when air conveyed may be below ambient temperature.

B. Secure insulation with vapor barrier with wires & seal jackets joints with vapor barrier adhesive or tape to match jacket.

C. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging.

D. Seal vapor barrier penetrations by mechanical fasteners, with vapor barrier adhesive. Stop & point insulation around access doors & damper operators to allow operation without disturbing wrapping.

E. Secure insulation without vapor barrier with staples, tape or wire,

F. Interior supply, return, & fresh air ductwork shall have coated 112" duct liner with adhesive applied to cover 100% of duct interior, for all rectangular ducts.

G. All fresh air & make-up air ducts shall be wrapped with 2" duct insulation.

H. Round sheet metal ducts shall be wrapped with 1', 314 lb. R=3.5 foil backed duct insulation.

END OF SECTION

SECTION 15990

TESTING, ADJUSTING, & BALANCING

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Air systems

1.2 SUBMITTALS
- A. Draft reports; Submit for review prior to final acceptance of Project.
- B. Test Reports: Submit prior to final acceptance of project & for inclusion in operating & maintenance manuals. Provide in soft cover, letter size, 3-ring binder, with index page & tabs, & cover identification. Include reduced scale drawings with air outlets & equipment identified to correspond with data sheets, & indicating thermostat locations.
- C. Report Forms: to equal AABC National Standards for Total System Balance forms or Forms prepared following ASHRAE 111.

PART 2 PRODUCTS – not used.

PART 3 EXECUTION

3.1 EXAMINATION & PREPARATION
- A. Before commencing work, verify that the systems are complete & operable.
- B. Report any deficiencies or abnormal conditions in mechanical systems which prevent system balance.
- C. Beginning of work means acceptance of existing conditions.
- D. Recorded data shall represent actually measured or observed conditions.
- E. Permanently mark settings of valves, dampers & other adjustment devices. Set & lock memory stops.

3.2 INSTALLATION TOLERANCES
- A. Air Handling Systems: Adjust to within ±5% for supply systems & ±10% for return & exhaust systems of design.
- B. Air Outlets & Inlets: Adjust to within ±10% of design.

3.3 AIR SYSTEM PROCEEDURE
- A. Adjust air handling & distribution systems to provide required or design supply, return, & exhaust air quantities.
- B. Make air quantity measurements in ducts by traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets & outlets.
- D. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers.
- E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required, Vary branch air quantities by damper regulation.
- F. Measure static air pressure conditions on air supply units, including filter & coil pressure drops, & total pressure across the fan. Allow for 50 % loading of fillers.
- G, Adjust automatic outside air, return air, & exhaust air dampers for design conditions.
- H. Measure temperature conditions across outside air, return air, & exhaust air dampers to check leakage.
- I. Where modulating dampers are provided, take measurements & balance

END OF SECTION

DIVISION 16 ELECTRICAL

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. General & Supplementary Conditions,& Division 1
- B. Temporary Electrical Service per Section 01500 (See Requirements)
- C. Grounding and bonding.
- D. Connection of utilization equipment.
- E. Supports.
- F. Identification.

1.2 SUBMITTALS
- A. Product Data: Provide catalog data for grounding and bonding devices,
- B. Operating and Maintenance Instructions: Provide maintenance and operating instructions for battery powered lighting units.
  1. Provide (1) one onsite training session and (2) complete sets of written instructions for set up, operation and maintenance of all lighting equipment supplied on the project by a representative that is familiar with the use, setup and maintenance of the equipment.
- C. Provide a set digital pictures on a CD for the owners record of all under-slab and in wall work after inspection by the building inspector having jurisdiction over the project and before backfill and/or wall materials are installed.(applies to all work hidden and unable to view at projects completion)
  1. Supply pictures of the type and minimum quality listed below.
     a. JPEG image, 5 mega pixel or better set to the largest format possible.
     b. Image must clearly show all items that will be hidden from view when project is completed. Pictures taken with a telephone camera will not be accepted.
  2. Supply a legend for the pictures to clarify the date, location, direction and/or wall in which the picture was taken.
  3. Submittal of these pictures to be part of project closeout 16050, 3.4

1.3 REGULATORY REQUIREMENTS
- A. Conform to requirements of ANSUNPPA 70 (NEC)
- B. Conform to all Local, City & Sate Codes
- C. Furnish products listed by Underwriters Laboratories, Inc. or other testing firm acceptable to authority having jurisdiction.
- D. Certify inspection & approval from authority having jurisdiction

1.4 PROJECT CONDITIONS
- A. Existing project conditions indicated on Drawings are based on casual field observation or existing record documents.
- B. Verify field measurements and circuiting arrangements are as shown on Drawings.
- C. Verify removal of existing electric worm.
- D. Report discrepancies to Architect/Engineer before disturbing existing installation or commencing work.

1.5 QUALITY ASSURANCE & COORDINATION
- A. Perform Work to requirements of NECA Standard of Installation.
- B. Obtain and review shop drawings, product data, and manufacturer's instructions for equipment furnished under other Sections to determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation and start-up of equipment furnished under other Sections

PART 2 PRODUCTS

2.1 GROUNDING MATERIALS
- A. Ground Rod: Copper, minimum 5/8" diameter x 10 feet length.

B. Provide active electrodes as required to perform work.
   1. Metallic-salt-tilled copper-tube electrode, length & shape as required; with U-bolt pressure plate connector or connector for exothermic welded connection.
C. Mechanical Connectors: Bronze.

2.2 BASIC MATERIALS
A. Steel channel: Galvanized or painted steel.
B. Miscellaneous Hardware; Treat for corrosion resistance.
C. Nameplates: Engraved three-layer laminated plastic, black letters on white background or embossed adhesive tape labels, with 3116 inch white letters on black background.
D. Wire and Cable Markers: Cloth markers, split sleeve or tubing type.

PART 3 EXECUTION

3.1 INSTALLATION
A. Install Products in accordance with manufacturer's instructions.
B. Install ground electrodes at locations indicated & additional rod electrodes as required to meet Regulatory Requirements.
C. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing as required by code & bond steel together, & to ground rod(s).
D. Provide bonding to meet Regulatory Requirements.
E. Provide isolated equipment grounding conductor for circuits supplying electronic cash registers, personal computers and in all licensed areas of Health Care Facilities.
F. Make electrical connections to utilization equipment in accordance with equipment manufacturer's instructions.
   1. Verify that wiring and outlet rough-in work is complete and that utilization equipment is ready for electrical connection, wiring, and energizalion.
   2 Make wiring connections in control panel or in wiring compartment of pre-wired equipment. Provide interconnecting wiring where indicated.
   3. Install and connect disconnect switches, controllers, control stations, and control . devices as indicated.
   4. Make conduit connections to equipment using flexible conduit. Use liquid-light flexible conduit in damp or wet locations.
   5. Install pre-fabricated cord set where connection with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.
   6. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes,
   7. Use wire & cable with insulation suitable for temperatures encountered in heat producing equipment.
G. Install support systems sized and fastened to accommodate weight of equipment and conduit, including wiring, which they carry.
   1. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors, preset inserts, or beam clamps.
   2. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and wafts; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
   3. Do not fasten supports to piping, ceiling support wires, ductwork, mechanical equipment, or conduit.
   4. Do not use powder-actuated anchors.
   5. Do not drill structural steel members.
   6. Fabricate supports from structural steel or steel channel.
   7. Install free-standing electrical equipment on concrete pads.
   8. Install surface-mounted cabinets and panelboards with minimum of four anchors.
   9. Provide steel channel supports to stand cabinets 1 inch off wall in wet locations.
   10. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.
H. Identify electrical distribution and control equipment, and loads served, to meet regulatory requirements and as indicated or scheduled.
   1. Degrease and clean surfaces to receive nameplates and tape labels.

2. Secure nameplates to equipment fronts using screws, rivets, or adhesive, with edges parallel to equipment lines. Secure nameplate to inside face of recessed panelboard floors in finished locations.
3. Use nameplates with 1I8" lettering to identify individual switches & circuit breakers, wall switches, receptacle circuits, & loads served.
4. Use nameplates with 114" lettering to identify distribution and control equipment.

I. Install wire markers on each conductor in panelboard gutters, pull boxes, and at load connections,
1. Use branch circuit or feeder number to identify power and lighting circuits.
2. Use control wire number as indicated on equipment manufacturer's shop drawings or schematic & interconnection diagrams to identity control wiring_

3.2 TRENCHING & BACKFILLING

A. Perform trenching & backfilling associated with the work of this Section in strict accordance with the provisions of Division 02000 of these Specifications.
B. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the conduit.
C. Install conduit promptly after trenching. Keep trenches open as short a lime as practicable.
D. Under the building or parking, install conduit on a 2' bed of damp sand. Backfill to bottom of slab or paving with damp sand, or crushed - gravel, stone, or slag.
E. Outside the building, install underground conduit on a 2" bed of damp sand. Backfill to 6" above conduit with damp sand or crushed slag. Backfill to within 12" of finish grade with acceptable till material. Backfill remainder with native soil. Tamp in firmly in lifts to achieve uniform compaction.
F. Do no backfill until installation has been approved & until Project Record Documents have been properly annotated.

3.3 FIELD QUALITY CONTROL

A. Upon completion of the electrical & communication installation, the electrical & communication contractors shaft provide the Architect I Engineer with a certificate the installation has been inspected for proper operation & that it complies with all applicable codes including NFPA 70 (National Electrical Code) & NFPA 72 (National Fire Alarm Code)_
B. The electrical & communication contractors shall submit certificates of performance for:
1. Electrical lighting & power distribution systems including, but not limited to, distribution equipment, wiring, conduit, light fixtures, switches, receptacles, motor starters, & junction boxes.
2. Emergency lighting & power systems including, but not limited to, wiring, conduit, light fixtures, junction boxes, etc.
3. Telephone Systems including, but not limited to, telephone outlets with jacks & wire.
4. Fire Alarm System including, but not limited to, annunciator panel, smoke detectors, manual stations, heat detectors, horn/strobes, strobes, etc.

3.4 PROJECT CLOSE OUT

A.. Upon completion of electrical and/or communication installation and before final payment is made, the electrical contractor will provide to the owner (2) two completed sets of as-built drawings detailing and showing *any* deviation from the contract documents, submittals(if different from original submittal), and any instruction/maintenance manuals supplied by manufacturer with equipment used on the project.
1. It will be the responsibility of the electrical contractor to provide all of the above from any sub-contractor that competes any work on the project under their contract.
a. All data, telephone, security, sound, fire alarm and cable TV wiring provided by the electrical contractor on this project or by one of the electrical contractors sub-contractors shall be included as part of the as-built requirement.

END OF SECTION

SECTION 16100

WIRING METHODS

PART 1 GENERAL

1.1 SUMMARY
- A. Section 16050 - Basic Electrical Materials & Methods
- B. Conduit and fittings.
- C. Electrical Metallic Tubing.
- D. Electrical boxes & Service fittings..
- E. Wire and cable.
- F. Wiring devices.
- G. Rough-in Only unless noted otherwise for:
  1. Telephone Systems & Service
  2. Cable TV
  3. Thermostats
  4. Data

1.2 SUBMITTALS
- A. Product Data: For review.
  1. Provide wiring device configurations, ratings, dimensions, and color selections.
  2. Provide service fitting configurations, dimensions, and finish and color selections.

1.3 REGULATORY REQUIREMENTS
- A. Conform to requirements of NFPA 70.
- B. Furnish products listed by UL or other testing firm acceptable to authority having jurisdiction

1.4 QUALITY ASSURANCE
- A. Perform Work in accordance with NECA Standard of Installation.

PART 2 PRODUCTS

2.1 CONDUIT AND FITTINGS
- A. Conduit:
  1. Metal Conduit and Tubing: Galvanized steel.
  2. Flexible Conduit: Steel or Aluminum.
  3. Liquidtight Flexible Conduit: Flexible conduit with PVC jacket.
  4. Plastic Conduit and Tubing: NEMA TC 2, PVC. Use Schedule 40 conduit.
  5. Non-Metallic Tubing: NEMA TC-13.
- B. Conduit Fittings:
  1. Metal Fittings and Conduit Bodies: NEMA FB 1.
  2. Plastic Fittings and Conduit Bodies: NEMA TC 3.

2.2 ELECTRICAL BOXES
- A. Boxes:
  1. Sheet Metal: NEMA OS 1, galvanized steel.
  2. Cast Metal: Aluminum or Cast feralloy, deep type, gasketed cover, threaded hubs.
  3. Nonmetallic: NEMA OS 2.
- B. Floor Boxes for Installation in Poured Concrete Floors: Semi-adjustable, cast iron.
- C. Hinged Cover Enclosures: NEMA 250, Type 1, steel enclosure with manufacturer's standard enamel finish and continuous hinge cover,, held closed by flush latch operable by screwdriver.
- D. Large Cast Metal Boxes:
  1. Surface-Mounted Type: NEMA 250, Type 4 and Type 6, flat flanged, surface-mounted junction box; cast aluminum box and cover with ground flange, neoprene gasket, and stainless steel cover screws,
  2. Underground Type: NEMA 250, Type 4, Inside flanged, recessed cover box for flush mounting; galvanized cast iron box and plain cover with neoprene gasket and stainless steel cover screws.

2-3 BUILDING WIRE AND CABLE

A. Feeders and Branch Circuits 8 AWG & Larger: Copper stranded conductor, 600volt insulation, THW or THHN/THWN.

B. Feeders and Branch Circuits smaller than 8 AWG; Copper conductor, 600 volt insulation, 'DV, THW, or THHN/THWN. solid conductor.

C. Control Circuits: Copper, stranded conductor, 600 volt insulation, THW,

2.4 ARMORED CABLE

A. Armored Cable, Size 14 Through 4 AWG: Copper conductor, 300 volt insulation, rated 60 degree C, Type AC.

B. Armored Cable, Size 4 Through 1 AWG: Copper conductor, 300 volt insulation, rated 60 degree C, Type AC.

2.5 REMOTE CONTROL AND SIGNAL CABLE

A. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 60 degree C, individual conductors twisted together & covered with PVC jacket.

B. Control Cable for Class 2 or Class 3 Remote Control & Signal circuits: Copper conductor, 300 volt insulation, rated 60 degree C, individual conductors twisted together & covered with PVC jacket; UL listed.

C. Plenum Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degree G, individual conductors twisted together [, shielded, J and covered with nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts, and plenums,

2.6 CORDS

A. Description: Oil-resistant thermoset insulated multi-conductor flexible cord with identified equipment grounding conductor, suitable for [extra] hard usage in damp locations.

2.7 WIRING DEVICES AND WALL PLATES

A. Wall Switch: TOGGLE

1. AC general use, quiet-operating snap switch rated 20 amperes and 120-277 volts AC, with plastic toggle handle, color by owner from standard color selections.

B. Receptacle: IVORY STANDARD

1. Provide straight blade receptacles to NEMA WD 1.

a. Convenience Receptacle Configuration: Type 5-20 R, plastic face, color by owner from standard color selections.

C. Wall Dimmers:

1. Rotary dial type, ivory color, 1500 Watts minimum, sized to accommodate circuit load shown on contract drawings, equal these manufacturers Slater DAF-1500 or DAF-2000, Challenger 3575 or 3576, and Leviton 61500 or 62000.

D. Decorative Cover Plate: match switch plate color in smooth nylon or high impact thermo-plastic.

E. All receptacles installed outdoors in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted.

2.8 SERVICE FITTINGS:

A. Recessed 3-Service floor Boxes: Equal Hubbel 3SFB-C for concrete or 3SFB-SS for wood construction with 1 duplex receptacle & 1 telephone/data plate, cable exit door & steel reinforced thermoplastic access door (verify color with owner / architect).

B. Recessed Duplex Receptacle: Equal Hubbell S-3925 duplex or S-2525 single brass cover plate on cast e-type box set flush with finish floor surface.

C. Receptacle Surface-type Service Fitting: One duplex configuration, satin aluminum housing, stainless steel device plate

D. Communication Surface-type Outlet Service Fitting: one bushed 1" inside diameter opening configuration, satin aluminum housing, stainless steel device plate

E. Surface Combination Fitting: One duplex convenience receptacle with one bushed 1" inside diameter opening configuration, satin aluminum housing, stainless steel device plate

F. Poke-Through Service Fitting: Flush Type with integral flush box and cover., Fire Rating: 3 hours, One duplex and one communications outlet,

G. Protective Ring: Brass or Aluminum finish,

H. Split Nozzle: Brass or Aluminum finish.

I. Carpet Ring: Brass or Thermo Plastic.

PART 3 EXECUTION

3.1 RACEWAY INSTALLATION

A. Use only specified raceway in the following locations:
   1. Installations In or Under Concrete Slab, or Underground : Rigid steel conduit or Plastic conduit with steel ells. Provide concrete encasement where indicated or required.
   2. Exposed Outdoor Locations: Rigid steel conduit or intermediate metal conduit or Electrical metallic tubing. Use threaded or rain tight fittings.
   3. Wet Interior Locations: Rigid steel conduit or intermediate metal conduit or Electrical metallic tubing. Plastic conduit on special conditions & where prior approved by Architect/Engineer. Use threaded or rain tight fittings for metal conduit.
   4. Concealed Dry interior Locations: Rigid steel conduit or intermediate metal conduit. Electrical metallic tubing.
   5. Exposed Dry Interior Locations: Rigid steel conduit or intermediate metal conduit. Electrical metallic tubing.
   6. Motor Connections: Flexible Conduit for vibrating equipment, length to be 36" or less.

B Size raceways for conductor type installed or for type TRW conductors, whichever is larger.
   1. Minimum Size Conduit: 1/2-inch .
   2. Maximum Size Conduit in Slabs Above Grade: 3/4-inch, do not route conduits larger than 1/2-inch to cross each other.

C. Use wire and cable in locations as follows:
   1. Concealed or Exposed interior Locations & Above Accessible Ceilings: Building wire in raceway(conduit) or Armored cable.
   2. Wet or Damp Interior Locations: Building wire in raceway.
   3. Exterior Locations: Building wire in raceways.
   4. Underground Locations: Building wire in raceway.

D. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring, Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet; and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.

3.2 EXAMINATION AND PREPARATION

A. Verity that supporting surfaces are ready to receive work.
B. Verify that interior of building is physically protected from weather.
C. Verify that mechanical work that is likely to injure conductors has been completed.
D. Completely and thoroughly swab raceway system before installing conductors.
E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned,
   1, Obtain verification from Owner of floor box locations, and locations of outlets in offices and work areas, prior to rough-in.

3.3 INSTALLATION

A. Perform Work according to NECA Standard of Installation.
B. Arrange conduit to maintain headroom and to present neat appearance.
   1. Route exposed raceway parallel and perpendicular to walls and adjacent piping.
   2. Maintain minimum 6-inch clearance to piping and 12-inch clearance to heat surfaces such as flues, steam pipes, and heating appliances.
   3. Maintain required fire, acoustic, and vapor barrier rating when penetrating walls, floors, and ceilings.
   4. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.
   5. Group in parallel runs where practical. Use rack constructed of steel channel- Maintain spacing between raceways or de-rate circuit ampacities to NFPA 70 requirements.
   6. Use conduit hangers and clamps; do not fasten with wire or perforated pipe straps.
   7. Use conduit bodies to make sharp changes in direction,
   8. Terminate conduit stubs with insulated bushings.
   9 Use suitable caps to protect installed raceway against entrance of dirt and moisture.

10. Provide No. 12 AWG insulated conductor or suitable pull string in empty raceways, except sleeves and nipples.
11. Install expansion-deflection joints where raceway crosses building expansion or seismic joints.
12. Install plastic conduit and tubing according to manufacturer's instructions,

C. Install surface metal raceway and multi-outlet assemblies according to manufacturer's instructions.
1. Use flat-head screws or clips and straps suitable for the purpose, to fasten channel to surfaces. Mount plumb and level.
2. Use suitable insulated bushings and inserts at connections to outlets and corner fittings in metal raceway.
3. Use fittings and accessories designed for use with raceway system.

D. Install auxiliary gutter and wire way according to manufacturer's instructions.

E. Install electrical boxes as shown on the drawings, and as required for splices, taps, wire pulling, equipment connections and regulatory requirements,
1. Use cast outlet box in exterior locations and wet locations.
2. Use hinged cover enclosure for interior pull and junction box larger than 12` in any dimension.
3. Locate and install electrical boxes to allow access. Provide access panels if required.
4. Locate and install electrical boxes to maintain headroom and to present neat mechanical appearance.
5. Install pull boxes and junction boxes above accessible ceilings or in unfinished areas.
6. Provide knockout closures for unused openings.
7. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
8. Coordinate mounting heights & locations of outlets above counters, benches, backsplashes, & at electric water coolers.
9 Install lighting outlets to locate luminaries as shown on reflected ceiling plan.

F. Use recessed outlet boxes in finished areas and where indicated.
1. Secure boxes to interior wail and partition studs, accurately positioning to allow for surface finish thickness.
2. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
3. Locate boxes in masonry walls to require cutting corner only. Coordinate masonry cutting to achieve neat openings for boxes.
4. Do not install boxes back-to-back in walls; provide 6 inches separation, minimum; except provide minimum 24 inches separation in acoustic-rated walls.
5. Do not damage insulation.

G. Install floor boxes according to manufacturer's instructions.
1. Set boxes lever and flush with finish flooring material.
2. Use cast floor boxes for installations in slab on grade,

H. Install cable and wire according to manufacturer's instructions,
1, Neatly [rain and secure wiring inside boxes, equipment, and panelboards.
2. Use wire pulling lubricant for pulling 4 AWG and larger wires.
3. Support cables above accessible ceilings to keep them from resting on ceiling tiles,
4. Make splices, taps, and terminations to carry full ampacities of conductors without perceptible temperature rise.
5. Terminate spare conductors with electrical tape.
6. Terminate aluminum wire according to manufacturer's instructions. Use tin-plated, aluminum bodied compression connectors. Fill with anti-oxidant compound prior to installation of conductor. Use suitable reducing connectors or mechanical connector adapters for connecting aluminum conductors to copper conductors.

I. Install wiring devices according to manufacturer's instructions,
1. Install wall switches 42" above floor, OFF position down.
2. Install wall dimmers 42" above floor. De-rate ganged dimmers as instructed by manufacturer. Do not use common neutral.
3. Install convenience receptacles 18 " above floor, 6 " above counters, grounding pole on bottom.
4. Install specific purpose receptacles at heights shown on Drawings.
5. Install cord and attachment plug caps on equipment under the provisions of Section 16050. Size cord for connected load and rating of branch circuit over-current protection.

J. Install wall plates flush and level.
   1. Install decorative plates on switch, receptacle, and blank outlets in finished areas,[using jumbo size plates for outlets installed in masonry walls].
   2. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.

K. Install service fittings according to manufacturer's instructions.

L Drill floor opening and install poke-through fittings according to manufacturer's instructions.

M. Interface outlet box, service fitting &/or floor box installation with furniture furnished by owner.

N. Provide & install wiring, in conduit for equipment & controls provided under other sections of these specifications including, but not limited to Plumbing & HVAC systems. Wiring systems in conduit include rough-in & connection for HVAC controls & thermostats as specified in Section 15600.

0. Caulk around conduits that pass through smoke partitions, fire-rated assemblies, & corridor walls, using a non-combustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with non-combustible material to within 112" of both r faces, & provide the waterproof compound described above. See Division 07000 - Fire-stopping, for requirements & materials.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing of Electrical system,
   1. Inspect wire and cables for physical damage and proper connection.
   2. Torque test conductor connections and terminations to manufacturer's recommended values.
   3. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.
   4. Comply with 16050, 3.4

END OF SECTION

SECTION 16400

SERVICE AND DISTRIBUTION

PART I GENERAL

1.1 SECTION INCLUDES
- A. Section f 6050 - Electrical Materials & Methods
- B. Service entrance and metering.
- C. Enclosed switches,
- D. Grounding & Lighting Arresters.
- E. Transformers.
- F. Panelboards.
- G. Enclosed circuit breakers.
- H. Fuses.
- I. Motor starters.
- J. Contactors.

1.2 SYSTEM DESCRIPTION
- A. Electric Service System: See drawings for amperages, voltages, phases, & number of wires at 60 Hz.

1.3 SUBMITTALS
- A. Shop Drawings: Indicate relevant information on panelboards.
- B. Product Data: Provide data on enclosed switches and circuit breakers, fuses, circuit breakers, busway plug-in devices, transformers, motor starters, and contactors.
- C. Test Reports: Submit for field inspection and testing_ Include description of procedures, duration, instruments used, and test values obtained. Present information in table comparing acceptable values to actual values.
- D. Operating and Maintenance Instructions: Panelboard NEMA PB 2.1.

1.4 REGULATORY REQUIREMENTS
- A. Conform to the requirements of Utility Company

1.5 MAINTENANCE
- A. Submit extra materials required for maintenance
  - 1. Provide two of each size of fuse.

PART 2 PRODUCTS

2.1 METERING EQUIPMENT
- A. Meter and CT's: By the local Power Company
- B. Meter Base, Conduits & Weatherheads by Electrical Contractor.

2.2 ENCLOSED SWITCHES
- A. Enclosed Switch Assemblies: NEMA KS 1; Type GD
  - 1. Fuse clips: Designed to accommodate Class R Fuses.
  - 2. Enclosures: NEMA KS 1; Type 1 or 3R as required.

2.3 FUSES
- A. Fuses 600 Amperes and Less: current limiting, one-lime fuse, 250 or 600 volt, UL Class RK 1 or RK 5.
- B. Fuses Larger Than 600 Amperes: Current limiting, fast-acting one time fuse, 600 volt, UL Class L.
- C. Fuse Int errupting Rating: 200,000 rms amperes.

2.4 GROUNDING MATERIALS

A. Ground Rods: Copper-encased steel, 314" diameter, minimum length 10'-0".
B. Clamps: Bronze.

2.5 PANELBOARDS
A. Equal these Manufacturers:
1. Cutler-Hammer
2 . ITE
3. Federal Pacific Electric
4. Square 'D"
5. C.E.
6. Westinghouse
B. Main and Distribution Panelboards: NEMA PB 1; circuit breaker type.
1. Enclosure: Type 1 or Type 3R.
2. Provide surface cabinet front with screw cover & lockable hinged door.
3. Bus: Copper or Copper Clad Aluminum.
4. Ground Bus: Copper.
5. Voltage: as noted on drawings.
6. Minimum Integrated Equipment Rating: 10,000 amperes rms symmetrical for 240 volt panelboards; 20,000 amperes rms symmetrical for 480 volt panelboards.
C. Lighting and Appliance Branch Circuit Panelboards:
1. NEMA PB 1; circuit breaker type.
2. Enclosure: NEMA PB 1; Type 1 or Type 3R as required.
3. Provide flush cabinet front with lockable door, keyed alike. Surface mounted cabinet allowed in electrical or mechanical rooms
4. Bus: Copper or Copper Clad Aluminum bus.
5. Ground Bus: Copper.
6. Voltage: as noted on drawings.
7. Minimum Integrated Equipment Rating: 10,000 amperes rms symmetrical for 240 volt panelboards.
D. Accessories: Provide circuit breaker accessories as indicated on Drawings_

2.6 ENCLOSED CIRCUIT BREAKERS
A. Circuit Breaker: NEMA AB 1.
B. Voltage: as shown on drawings to match equipment.
C. Interrupting Rating: 10,000 amperes minimum.
D. Enclosure: NEMA AB 1; Type 1 or 3R as required; steel.
E. Accessories As indicated on Drawings.

2.7 MOTOR STARTERS
A. Manual Motor Starter:
1. NEMA ICS 2; AC general purpose Class A manually operated, full-voltage controller with overload relay, & push button operator.
2. Fractional Horsepower Manual Starter: NEMA ICS 2; AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, & toggle operator.
3. Enclosure: NEMA ICS 6; Type 1,
B. Magnetic Motor Starter: NEMA ICS 2.
1. Full Voltage Motor Starters: AC general-purpose Class A magnetic controller for induction motors rated in horsepower
2. Two-Speed Starters: Include integral time delay transition between FAST and SLOW speeds,
3. Coil Operating Voltage: as required for equipment.
4. Extra Auxiliary Contacts: 2 normally open & field convertible.
5. Control Power Transformers: 120 volt secondary.
6. Enclosure: Type 1.
7. Combination Motor Starters: Combine motor starters with molded case circuit breaker or fusible switch in single enclosure.

2.8 CONTACTORS

A. General Purpose Contactors: NEMA ICS 2; mechanically or electrically held.
   1. Enclosure; NEMA ICS 6; Type 1.
   2. Lighting Contactors: NEMA ICS 2; mechanically or electrically held. Enclosure: NEMA ICS 6; Type 1.
   3. Provide bus terminals suitable for mounting in panelboard.

2.9 LIGHTING ARRESTERS

A. Furnish & install lighting arrester(s) of proper voltage & phase in the main distribution equipment as required to protect the system.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Make arrangements with Utility Company to obtain permanent electric service to the Project.

3.2 INSTALLATION

A. Install Utility services in accordance with Utility Company instructions. See riser diagram on drawing for service entrance type, size, location etc.
B. Install equipment in accordance with manufacturer's instructions.
C. Install proper fuses in each fused switch.
D. Provide grounding and bonding to NFPA 70.
   1. Supplementary Grounding Electrode: Use driven ground rod on exterior of building.
   2. Provide for effectively grounding of metal frame of the building.
   3. Provide separate, insulated equipment grounding conductor in feeder and branch circuits.
   4. Terminate each end on a grounding lug, bus, or bushing.
   5. Provide grounding and bonding at Utility Company's metering equipment and pad-mounted transformer.
   6. Use 6 AWG minimum size, copper conductor to bond communications system grounding conductor to nearest effectively grounded metallic water pipe.
E. Install panefboards and load centers to NEMA PB 1.1,
F. Panelboards shall be field marked, per NEC 110.16, to warn qualified persons of potential electric arc flash hazards, The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. Warning to be per NFPA 70E-2000, Electrical Safety Requirements for Employee Workplaces & ANSI Z535.4-1998, Product Safety Signs and Labels,

3.3 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for lightness and proper installation.
B. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point by passing minimum current of 10 amperes DC and measuring voltage drop.
   1. Maximum resistance: 10 ohms.

3.4 CLEANING

A. Clean equipment finishes to remove paint and concrete splatters.

END OF SECTION

SECTION 16500

LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES
- A, Section 16050 - Electrical Basic Materials & Methods
- B. Luminaires and lampholders.
- C. Lamps,
- D. Ballasts,
- E. Exit Signs.
- F. Emergency lighting units.

1,2 SUBMITTALS
- A. Shop Drawings: Indicate construction details for Products which are not manufacturer's standard.
- B. Product Data: Provide product data for each Luminaire and lighting unit.
- C. Operating and Maintenance Instructions: Provide maintenance and operating instructions for battery powered lighting units.
  1. Provide (1) one onsite training session and (2) complete sets of written instructions for set up, operation and maintenance of all lighting equipment supplied on the project by a representative that is familiar with the use, setup and maintenance of the equipment.

1.3 REGULATORY REQUIREMENTS
- A. Conform to requirements of ANSI/NFPA 70.
- B. Conform to requirements at NFPA 101.
- C. Furnish products listed by Underwriters Laboratories, Inc. or other testing firm acceptable to authority having jurisdiction.

1.4 MAINTENANCE
- A. Provide two extra of each lamp installed.
- B. For future service & repair leave all opened remaining cartons I packages of lamps at project site to give to Owner.

PART 2 PRODUCTS

2.1 LUMINAIRES AND LAMPHOLDERS
- A. Luminaire Schedule: Product requirements for each luminaire and lampholder are specified in luminaire schedule on Drawings.
- B. Accessories: Provide required accessories for mounting and operation of each luminaire as indicated.
  1. Recessed Luminaires: Provide trim type suitable for ceiling system in which luminaire is installed.
  2. Thermal Protection: Provide thermal protection devices to meet NFPA 70 requirements.
  3. Surface Luminaires: Provide spacers and brackets required for mounting.
  4. Pendant Luminaires: Provide swivel hangers, pendant rods, tubes, and chains as indicated to install luminaire at appropriate height.

2.2 EMERGENCY LIGHTING UNITS
- A. Description: Sell-contained emergency lighting unit 120 volt units or connected to emergency power circuit..
  1. If sell-contained unit to have nickel-cadmium battery & Dual-rate battery charger with AC ON, RECHARGING; TEST switch indicators and controls,

2.3 EXIT SIGNS

A. Construction:
   1. Housing: Extruded aluminum or thermal plastic as noted on schedule.
   2. Face: Aluminum stencil face with red or green letters as required by code.
   3. Directional Arrows: Universal type for field adjustment.
   4. Mounting: Universal, for field selection.

B. Emergency Power Supply: Either emergency generator or an integral, fisted for emergency lighting use nickel-cadmium battery with dual-rate battery charger having AC ON; TEST switch indicators and controls.

2.4 LAMPS

A. Description:
   1. Incandescent Lamps: 125 volts, shape as scheduled.
   2. Fluorescent Lamps: Type and color as scheduled.
   3. Mercury Vapor HID Lamps: Deluxe white or Color improved.
   4. Metal Halide HID Lamps: Phosphor coated.
   5. High Pressure Sodium HID Lamps: Clear, suitable for ballast furnished in luminaire and for all burning positions.
   6. Reflector Lamp Beam Patterns: Conform to ANSI 078,379.

2,5 FLUORESCENT BALLASTS

A. Provide fluorescent ballast suitable for use under installation conditions listed for each luminaire and lampholder.
   1. Voltage: As scheduled.
   2. Ballasts for nominal 430 mA lamps: Premium, Super-premium, or Electronic type as scheduled.

2.6 ACCESSORIES

A. Provide Wall Brackets, Photo controls, Bolt Covers, Anchor Bolts, Hardware, etc. as required for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine adjacent surfaces to determine that surfaces are ready to receive work.

3.2 INSTALLATION

A. Install Luminaires and accessories in accordance with manufacturer's instructions.
   1. Provide pendant accessory to mount suspended Luminaires at height indicated,
   2. Support surface-mounted Luminaires from ceiling grid tee structure; provide auxiliary support laid across top of ceiling tees. Fasten to prohibit movement.
   3. Install recessed Luminaires to permit removal from below. Use plaster frames. Install grid clips in gymnasium & multipurpose spaces.
   4. Install lamps in Luminaires and lampholders.

3.3 ADJUSTING AND CLEANING

A. Align Luminaires and clean lenses and diffusers at completion of work.
B. Aim adjustable Luminaires and lampholders as indicated or as directed.
C. Adjust directional arrows on exit signs to meet approval of authority having jurisdiction.
D. Clean paint splatters, dirt and debris from installed Luminaires.
E. Touch up luminaire finish at completion of work.
F. Re-lamp Luminaires which have failed lamps at completion of work.

END OF SECTION

SECTION 16720

FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:
- A. Section 16050: Basic Materials and Methods
- B. Fire alarm and smoke detection system
- C. Related Sections: 16100-400 Electrical

1.2 SUBMITTALS
- A. Shop Drawings: Indicate fire alarm and smoke detection system wiring diagrams.
- B. Product Data: Provide data on each fire alarm and smoke detection component.
- C. Provide a set digital pictures on a CD for the owners record of all under-slab and in wall work after inspection by the building inspector having jurisdiction over the project and before backfill and/or wall materials are installed.(applies to all work hidden and unable to view at projects completion)
  1. Supply pictures of the minimum quality listed below.
     - a. JPEG image, 5 mega pixel or better set to the largest format possible.
     - b. Image must clearly show all items that will be hidden from view when project is completed.
  2. Supply a legend for the pictures to clarify the date, location, direction and/or wall in which the picture was taken.
  3. Submittal of these pictures to be part of project closeout 16720, 3.4
- D. Operation and Maintenance Instructions: Provide (1) one onsite training session and complete written instructions, to the owner on the use, features and maintenance of the fire alarm and smoke detection system.
- E. Submit under provisions of Division 01000.

1.3 REGULATORY REQUIREMENTS
- A. Conform to NFPA 72 code for fire alarm and smoke detection systems. Certify inspection and approval from authority having jurisdiction.
- B. Conform to NFPA 101,

1.4 MAINTENANCE
- A. Submit extra materials required for maintenance; Two spare fire alarm station glass fronts

1.5 QUALITY ASSURANCE
- A. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment shall be listed under UL category UOJZ as a single control unit. Partial listing shall not be acceptable.
- B. In addition to the UL-UOJZ requirement mentioned above, the system controls shall be UL listed for Power Limited Applications per NEC 760. All circuits must be marked in accordance with NEC article 780-23.

1.6 GENERAL
- A. New Fire Alarm System with required control modules, wiring and equipment as required. The new system shall use closed loop initiating device circuits with individual zone and individual indicating appliance circuit supervision.
- B. Include manual pull stations, automatic fire detectors, horns, flashing lights, all wiring, connections to devices, outlet boxes, junction boxes, and all other necessary material for a complete operating system.
- C. Al! panels and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name on each component.
- D. Equipment submissions must include a minimum of the following:
  1. Complete descriptive data indicating UL listing for all system components.
  2. Complete sequence of operations of the system.
  3. Complete system wiring diagrams for components capable of being connected to the system and interfaces to associated equipment.
  4. A copy of any state or local Fire Alarm System equipment approvals (if required by local jurisdiction).

1.7 OPERATION

A. The system alarm operation subsequent to the alarm activation of any manual station or automatic detection device shall be as follows:
   1. All audible alarm indicating appliances shall sound a pattern until silenced by the alarm silence switch at the control panel or the remove enunciator.
   2. All visual alarm indicating appliances shall display a pattern until extinguished by the Alarm Silence Switch.
   3. A supervised signal to notify the focal fire department or an approved central station shall be activated. To accommodate and facilitate job site changes, the type of 'city connection circuit` shall be on site configure-able to provide a "reverse polarity" connection.
   4. The associated initiating device circuit red LED shall (lash on the existing control panel until the alarm has been silenced at the control panel. Once silenced, this same LED shall latch on. A subsequent alarm received from another zone after silencing shall flash the subsequent zone alarm LED on the control panel. A pulsing alarm tone shall occur within the control panel and the remote enunciator until silenced.

B. The alarm indicating appliances may be silenced after one (1) minute by authorized personnel upon entering the existing looked control cabinet and operating the alarm silence switch and the remove enunciator. A subsequent zone alarm shall reactivate the signals.

C. The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within one minute the system shall resume normal operation. The Alarm Verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by zone.

D. Alarm and trouble conditions shall be immediately displayed on the control panel front without manual inquiry.

1.8 SUPERVISION

A. All auxiliary manual controls shall be supervised so that all switches must be returned to the normal automatic position to clear system trouble.

B. Each independently supervised circuit shall include a discrete amber "Trouble" LED to indicate disarrangement conditions per circuit.

C. The System Expansion Modules connected by ribbon cables shall be supervised for module placement. Should a module become disconnected from the C.P.U. the system trouble indicator must illuminate and audible trouble signal must sound.

D. Should a serial enunciator fail to communicate to the control panel for any reason, the system enunciator trouble indicator (LED) shall pulse a specific number of times at the control panel to indicate which enunciator has failed to communicate.

1.9 POWER REQUIREMENTS

A. The existing control panel has 120 VAC power (with battery backup) via a dedicated fused disconnect circuit.

B. All circuits requiring system operating power shall be 24 VDC and shall be individually fused at the control panel. Battery standby shall be 24 hours with 5 min of alarm, provide calculations to verify this requirements.

PART 2 PRODUCTS

2.1 FIRE ALARM CONTROL PANEL

A. Where shown on the plans, provide and install to equal a Simplex 4005-Series Fire Alarm Control Panel. Construction shall be modular with solid state, microprocessor based electronics. All visual indicators shall be high contrast, LCD or LED type.

B. The control panel shall contain the following features:
   1. 2 Initiation Device Circuits (Addressable Points) (4005 = 8 zones)
   2. 2 Alarm indicating Appliance Circuits (Hard-Wired Input/output (I/O) Points)
   3. 1 Digital Alarm Communicating Transmitter.
   4. 1 Earth Ground Supervision Circuit
   5. 1 Basic minimum 5 Amp power supply

6. 1 Automatic Battery Charger
7. 1 set Standby Batteries
8. 1 lot Resident non-volatile programmable operating system memory for all operating requirements
9. 1 Supervised Manual Evacuation Switch

2.2 MANUAL STATIONS

A. Equal; Simplex type 4099 series double action and shall be constructed of high impact, red Lexan with raised white lettering and a smooth high gloss finish. To minimize nuisance alarms, activation shall require two separate and distinct actions. The first action shall require a glass front to be broken exposing the pull lever. The second action requires the operating lever to be pulled down. Once pulled down, the lever shall remain at a 90 degree angle from the front of the station to provide a visual indication of the station in alarm. Reset shall require a key common to the control panel and replacement of the glass window. Pull station shall be by the same manufacturer to insure compatibility.

2.3 SMOKE DETECTORS

A. System Smoke Detectors: Furnish and install where indicated on the plans, to equal a Simplex 4098 series smoke detectors with 4098-series base.

B. Detectors shall be listed to U.L. standard 268 and shall be documented compatible with the control equipment to which it is connected. Detector shall be listed for this purpose by Underwriters Laboratories, Inc. The detectors shall obtain their operating power from the fire alarm panel supervised detection loop. The operating voltage shall be 24 VDC (nominal). Removal of the detector head shall interrupt the supervisory circuit of the tire alarm detection loop and cause a trouble signal to be generated at the control panel.

C. Each detector shall have a flashing status indicating LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady and at full brilliance. The detector may be reset by actuating the control panel reset switch.

D. To minimize nuisance alarms, voltage and RF transient suppression techniques shall be employed as well as a smoke verification circuit and an insect screen. The detector design shall provide full solid state construction and compatibility with other normally open fire alarm detection loop devices (heat detectors, pull stations, etc.). The detector head shall be easily disassembled to facilitate cleaning.

2.4 AUTOMATIC.HEAT DETECTORS

A. Automatic heat detectors shall be rate-of-rise & fixed-temperature type. When activated, the units shall be non-restorable and give visual evidence of such operation. Heat detectors equal Simplex type 4098 series (135 degrees F).

2.5 HORNS/STROBES

A. Horns/Strobe to equal Simplex type 4903 series. The units shall be polarized and shall be operated by 24 VDC. Each assembly shall include separate wire leads for in/out wiring for each leg of the associated signal circuit. T-tapping of signal device conductors to signal circuit conductors shall NOT be accepted. The visible unit to be 110 Candela-Second Xenon flash & horn to be 87dB @ 10 feet. The white Lexan lens shall have the work `FIRE' in red lettering.

2.6 VISUAL LAMPS

A. Visual indicating appliances equal Simplex type 4904 series. The lamp assembly shall incorporate a built-in reflector for more efficient light propagation and a special shock-mouriting arrangement to resist bulb failure due to vibration. Lamp shall provide 4 wire connection to insure properly supervised in/out system connection. These units shall be U.L. listed and capable of either ceiling or wall mounting. The unit shall be complete with a temper resistant, pyramidal shaped Lexan lens with "Fire" lettering visible on front. Visual units shall be 110 Candela•Second Xenon flash output to meet ADA requirements.

2.7 DOOR HOLDERS

A. Door Holders; Magnetic door holders shall be Simplex type 2088-series and shall have an approximate holding force of 35 lbs. The door portion shall have a stainless steel pivotal mounted armature with shock absorbing nylon bearing. Unit shall be capable of being recessed mounted as required. Door holders shall be UL listed for their intended purpose. Locate as follows:

2.8 DUCT SMOKE DETECTORS

A Duct Smoke Detectors: Duct smoke detectors shall be Simplex type 4098 series and shall be of the solid state photoelectric type and shall operate on the light scattering photodiode principle. The detectors shall be designed to ignore invisible airborne particles or smoke densities that are below the factory set alarm point. No radioactive materials shall be used. Each duct detector to have associated model 2098-9806 remote alarm indicator & test switch located nearby in mechanical room.

B. Detector construction shall be of the split type, that is, mounting base with twist-lock detecting head, Contacts between the base and head shall be of the bifurcated type using spring-type, self-wiping contacts. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loops and cause a trouble signal a the control panel. Detector design shall provide full solid state construction and compatibility with other normally open fire alarm detection loop devices (heat detectors, pull stations, etc.). Duct housing couplings shall be slotted to insure proper alignment of the sampling and exhaust tubes. detector shall have an alarm LED visible through a transparent front cover. Detectors shall obtain their operating power from the supervised current in the fire alarm loop. Installation must comply with NFPA-09A.

2.9 WIRE/CABLE

A. Non-power limited fire-protective signaling cable, copper conductor, 150 volt insulation rating 60°C.

B. Power limited fire-protective signaling cable, copper conductor, 300 volt insulation rating 105°0.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide and install the system in accordance with the plans and specifications all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC Article 760 A and C, Power Limited Fire Protective Signaling Circuits or if required, may be reclassified as no-power limited and wired in accordance with NEC Article 760 A and B. Upon completion, the contractor shall so certify in writing to the owner and general contractor. All junction boxes shall be sprayed red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.

B. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate sub-contractors,

C. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.

D. The manufacturer's authorized representative shall provide on-site supervision of installation.

E. Install fire and smoke detection alarm system in accordance with manufacturer’s instructions,

1. Install manual station with operating handle 42" above floor & audible and visual signal devices 7'-3" above floor.
2. Install fire alarm system wiring in conduit in concealed locations,
3. Mount end-of-line device in box with last device or separate box adjacent to last device in circuit.
4, Make conduit and wiring connections to duct smoke detectors.
5. The system shall use closed loop initiating device circuits and be wired as such.

F. All conduit, conduit fittings, pull boxes, junction boxes, 120V AC circuits and system ground cable shall be provided and installed by electrical contractor under Section 16110 - Raceway Systems.

G. Racks, back boxes, etc, which are not standard rough-in items shall be provided by fire alarm contractor and installed by electrical contractor as part of rough-in.

H. Provide for & coordinate with other contractors for the connection of their systems to fire alarm system. This may include, but not limited to sprinkler system flow & tamper switches, elevator capture, HVAC equipment shut-down & damper controls, telephone city tie, & fire pump controls.

3.4 PROJECT CLOSE OUT

A.. Upon completion of fire alarm installation and before final payment is made, the fire alarm contractor will provide to the owner (2) two completed sets of as-built drawings detailing and showing *any* deviation from the contract documents, submittals(if different from original submittal), and any instruction/maintenance manuals supplied by manufacturer with equipment used on the project.

1. It will be the responsibility of the fire alarm contractor to provide all of the above from any sub-contractor that competes any work on the project under their contract.

END OF SECTION