PROJECT MANUAL

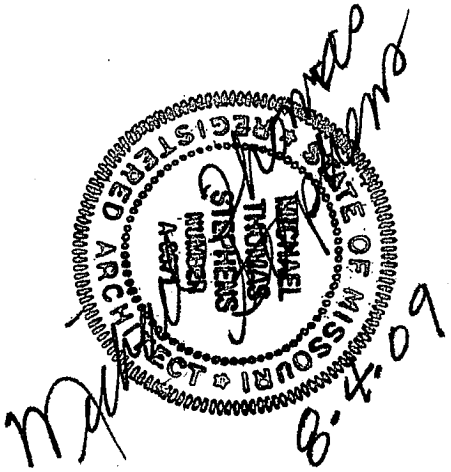
for

YMCA Webb City

New Childcare Center

Webb City, Missouri

August 4, 2009



Architect

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

Structural Engineer

Thomas Edelman
Structural Engineer
Springfield, MO
417-882-9850

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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INVITATION TO BID

PART 1

1.1 GENERAL

A. The Owner: YMCA Webb City
Webb City, MO 64870

B. The Project: YMCA Webb City
New Childcare Center-Webb City, MO

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: Renovation of existing 12,660 sq.ft. pre-engineered metal building for childcare center. New floor plan to have offices, classrooms, restrooms, and multi-purpose room.

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, July 29, 2009, 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

YMCA Webb City
New Childcare Center-Webb City, 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 Lincoln Land Baptist Church located in Springfield, Illinois 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: YMCA Webb City
New Childcare Center-Webb City, Missouri

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 Michael Stevens 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

DOCUMENT 00702

GENERAL CONDITIONS

PART 1

1.1 GENERAL CONDITIONS

A. AIA Document A201 "General Conditions of the Contract for Construction", 1997 Edition is hereby made a part of the Contract Documents for this Work. A copy of the referenced AIA Document is on file at the offices of the Architect. All persons intending to provide goods or services in connection with the Work are advised to read and understand the referenced AIA Document prior to proceedings.

1.2 SUPPLEMENTARY CONDITIONS

A. Refer to Document 00811 for amendments to these General Conditions.

PART 2

NOT USED

PART 3

NOT USED

END OF SECTION

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

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK UNDER THIS CONTRACT:

A. Construction and completion of A New Auditorium Building to be located at 4000 S. Connecticut, Joplin, Missouri for: First Baptist Church, 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 First Baptist Church of Joplin, Missouri.

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, 2003 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).
2. Security systems (Owner).
3. Phone, Communications and Data (computer network) Equipment (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.

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 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 10th of each month, the Contractor shall issue progress payments to the sub-contractors.

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.

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 reinspect 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

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 trafficways, provide detectable warning surface for ramp complying with ADAAG.

END OF SECTION

SECTION 03001

CAST IN PLACE 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.

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 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

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.

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 ROUGH HARDWARE

A. Nails, metal connectors, bolts, screws, staples, and other fasteners (except as specified or noted otherwise); hot-dip galvanized steel.
B. Screws used in finish carpentry; brass, exposed screws N.P. oval head with N.P. finish washers.

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

2.5 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

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, or 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 referencd standard, except do not use staples in exposed millwork construction.

A. Cabinetwork Design: Reveal overlsy; 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 recomended by plastic laminate manufacturer. Provide self-edged and postformed 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 veneeer leaves, running match veneer within panel face; premanufactured 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

SECTION 07210

BUILDING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rigid board thermal insulation at perimeter foundation walls.
B. Fibergalss batt thermal insulation in exterior frame wall and roof construction.
C. Fiberglass batt sound insulation at interior frame partitions.
D. Vinyl face fiberglass blanket insulation at metal building walls and roof.

1.2 ENVIRONMENTAL REQUIREMENTS

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

1.3 LOCATION REQUIREMENTS

A. Provide insulation in all exterior walls and roof of the building to provide a continuous thermal envelope for conditioned areas unless specifically indicated otherwise.
B. For metal building construction provide insulation to prevent condensation of moisture on inside surface of all metal panel walls and roofs in unconditioned areas.

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

A. Perimeter Foundation Insulation: Dow "Styrofoam SM" foam insulation board, 1-1/2" thick is specified; equivalent products of Amoco Foam, UC Foam and Minnesota Diversified are acceptable.
B. Fiberglass Batt Insulation: 4" (R-13) faced with mesh reinforced Kraft paper at 4" exterior frame studwalls. 4" (R-13) faced with mesh reinforced Kraft paper at 4" exterior frame studwalls. 3 1/2" (R-11) unfaced sound insulation at interior frame partitions and suspended ceilings. 6" (R-19) unfaced at suspended ceilings where additional sound protection and/or higher R-Value is specified and at 6" wall between main restrooms for additional sound protection.
C. Vinyl Face Metal Building Insulation for conditioned areas: For roof and walls of metal building structure, provide insulation meeting ASTM C 991 TYPE II and carrying a UL rating of 25/50. 4" thick (R-13), 0.6 pound density fiberglass blanket with flexible white polypropolene/scrim/kraft face, WMP-VR as manufactured by LamTec Corporation
    1. Approved alternate insulation method for higher R-Value's if required will be equal to GBP Slivercote Energy Saver-FP System or Thermal Design, Inc.'s Simple Saver System.
        a. Minimum R-Values to be R-30 in walls and roof.
D. Vinyl Face Metal Building Insulation for unconditioned areas: For roof and walls of metal building structure, provide insulation meeting NAIMA PED202 and carrying a UL rating of 25/50. 3" thick (R-11), 0.6 pound density fiberglass blanket with flexible white polypropolene/scrim/kraft face, Lamtec WMP-10 or Compac MB2001 as manufactured by LamTec Corporation.

2.2 MISCELLANEOUS MATERIALS: Provide adhesive for bonding insulation, mechanical anchors or other required items as recommended by the insulation manufacturer.

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 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: 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: 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: 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.

A.. 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".

B. One-Component Nonsag Urethane Sealant: Type M, grade NS, Class 25. Sonneborn "Sonolastic NP 1", Tremco "Dymonic", Pecora "Dynatrol I", or Mameco "Vulkem 116".

C. One-Component pourable urethane Sealant: Type S, grade P, Class 25. Sonneborn "Sonolastic Paving Joint Sealant", Pecora "NR-201 Urexpan", or Mameco "Vulken 45".

D. 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: 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: Calking and sealant usage is specified below.

A. Calking: All interior joints except joints with metal, aluminum, and wet work.

B. 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: 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

SECTION 08110

METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SCOPE: Provide metal frames, hollow metal doors, and related items required to complete work. 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: Steelcraft is specified. Equivalent products of Mesker, Republic, Ceco, Curries, and Dittco are acceptable.

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: Provide wood doors, complete. 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 construciton, 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 phamplet "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: 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: Molding for light opening; manufacturer's standard flush solid stock wood molding, in species to match face veneer.

2.4 FABRICATION: Fabricate flush wood doors to produce doors complying with the following requirements:
   A. In sizes indicated for job-site fitting.
   B. Metal Astragals: Premachine 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 requirenments of referenced standards for kinds of doors requried.
      1. Light Openings: Trim openings with moldings of material and profile specified.

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 accomodate 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. Rehang 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 08410

ALUMINUM ENTRANCES, WINDOWS AND STOREFRONTS

PART 1 - GENERAL

1.1 SCOPE: Provide aluminum swinging doors, aluminum storefront framing, and hardware complete.

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

1.3 QUALITY ASSURANCE: 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, except cylinders. Kawneer Series 190 or approved equal product as manufactured by Vistawall or Efco.
- B. Pull: Style "T" offset pull handle.
- C. Closer: Norton 1605 surface closer with back check and adjustable hold open.
- D. Pivots: Manufacturer's standard, top and bottom offset pivots.
- E. Locks: Adams Rite 1850A deadlock.
- F. Threshold: Manufacturer's standard with anchors and clips, coordinated with offset pivots and closer. Maximum 1/2" height.
- G. Weather-stripping: Sealair weather system.
- H. Exit Device: Von Duprin Type 33 Concealed Vertical Rod, or equal as manufactured by Dor-O-Matic or Jackson.
- I. Glazing; 1/4" thick clear tempered float (tinted at exterior, clear at interior), 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: 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 08520

ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Conditions
B. Supplementary Conditions
C. Division 1
D. Aluminum Windows
E. Glass and framed insect screens

1.2 SYSTEM DESCRIPTION

A. Performance:
   1. Air Leakage: ANSI/ASTM E283; .16 cu ft/min/ft at 1.57 psf.
   2. Water resistance: No leakage at 5.25 psf.
   3. Condensation Resistance Factor: Not less than 47.
B. Design and size members to withstand dead loads caused by pressure and suction of wind.
C. Drain water entering the frame, to exterior.

1.3 SUBMITTALS

A. Shop Drawings: Indicate dimensions, relation to construction of adjacent work, air and vapor seal with adjacent construction, component anchorage and locations, anchor methods, shim methods and materials, hardware, and installation details.
B. Product Data: Manufacturer's specifications for materials and fabrication, test reports indicating compliance with performance requirements.

1.4 QUALITY ASSURANCE

A. AAMA certification; ANSI/AAMA 101.88: DH-C35

1.5 WARRANTY

A. Provide ten year warranty coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement.

PART 2 PRODUCTS

2.1 WINDOW UNITS

A. Shop manufactured Aluminum Storefront Windows using extruded aluminum stock of ANSI/ASTM B221 alloy. Exterior: 4 1/2 x 2 inch profile; .080 inch, 6063-T5 aluminum extrusions; cast in place polyurethane resin thermal barrier, .078 inch flush glazing stops. Equal these Manufacturers:
   1. PPG Industries
   2. Kawneer Company
   3. Tubelite Alum. Div.
   4. Amarlite
B. Window Unit Configurations: Fixed (see plans).
C. Insulated Glass: Double pane with glass elastomer edge seal; inner & outer panes of 1/4" clear glass, purge interpane space with dry hermetic air; total unit thickness of 1 inch.
D. Finish: Exposed areas of aluminum components: AA-M12 C22 A44 Class I, dark bronze anodic coating finish.

2.2 FRAME MATERIALS AND ACCESSORIES

A. Extruded Aluminum: 6063-T5 alloy and temper.
B. Sills: Extruded aluminum; sloped for positive wash, one piece full width of opening and jamb angles to terminate sill length.
C. Sealant and Backing Materials: As specified in Section 07900.
D. Anchor Devices: Non-corroding.
E. Accessory items: drip caps and trim as indicated.

2.3 GLASS AND GLAZING MATERIALS

A. Factory glaze with 1" thick clear insulated glass units, ASTM E774, Class A, CBA rated single seal, aluminum spacer.
B. Interior Windows into Nursery Rooms, Crib Areas, Cry Rooms, & such shall have one-way mirrored glass.
C. Interior Windows to have glass rated for the wall assembly in which they are installed (typically egress corridors & stairs are fire rated 1 hour - see plans to verify).

2.4 FABRICATION

A. Fabricate frames and mullions with reinforced corners and joints. Supplement frame with internal reinforcement where required for structural rigidity.
B. Permit internal drainage weep holes and channels to migrate moisture to exterior.
C. Form glass stops, exterior sills, closures, weather stops, and flashings of same material as window frame.

2.5 FINISHES

A. Exterior Surfaces: bronze color baked enamel, AAMA 603.8. (Verify color with Owner / Architect)
B. Interior Surfaces: same as exterior.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that rough openings are correctly sized and located.
B. Prepare opening to permit correct installation of frame and achieve continuity of air and vapor barrier seal.

3.2 INSTALLATION

A. Install units, and flashings in accordance with manufacturer's instructions.
B. Use anchorage devices to securely attach frames to structure.
C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
D. Coordinate attachment and seal of air and vapor barrier materials. Fill shim spaces at perimeter of assembly with foamed-in-place insulation to maintain continuity of thermal barrier.
E. Install perimeter type sealant, backing materials, and installation requirements in accordance with Section 07900.

END OF SECTION

SECTION 08705

FINISH HARDWARE

PART 1 GENERAL

1.1 SCOPE: Furnish complete hardware of every sort and description as required to adequately equip all movable parts throughout the building for perfect operation. Furnish hardware not specified but obviously required for completion of the project, conforming to size, function, quality, and utility of other hardware specified.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS: Coordinate the work of this section with any other directly affected sections requiring any integral reinforcement for door hardware.

A. Metal Doors; Section 08110
B. Wood Doors; Section 08210

1.3 QUALITY ASSURANCE

A. Manufacturers: Obtain each type of hardware from a single manufacturer.
B. Hardware Supplier: Company specializing in supplying door hardware and which has currently employed a certified Architectural Hardware Consultant.
C. Perform work in accordance following the requirements and standards of:
    1. BHMA - Builder's Hardware Manufacturer's Association.
    2. DHI - Door Hardware Institute.
    3. ANSI A117.1 - Specifications for making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
D. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.
E. Furnish minimum series 4000 grade 2 locksets.

1.4 SUBMITTALS: Comply with Section 01300

A. Hardware Schedule: As soon as practicable after award of contract and prior to ordering of hardware, submit to Architect for review, a schedule of hardware to be furnished. Include type, style, function, size and finish of each hardware item; name and manufacturer of each item; fastenings and other pertinent information; location of hardware set cross-referenced to drawing indications, mounting locations for hardware, and door and frame sizes and materials.
B. Product Data: Deliver to installer instructions for installation and maintenance of operating parts and exposed finishes. Furnish templates to fabricators of other work to receive finish hardware.

1.5 PRODUCT HANDLING: Furnish hardware separately unit packed (complete with necessary attachments and fastenings), labeled, and numbered in accordance with Hardware Schedule. Deliver at proper times to proper locations (shop or project site) for installation. Deliver keys to Owner by security shipment direct from hardware supplier.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Furnish hardware complying with requirements set forth by ADAAG (Americans with Disabilities Act Guidelines) and UFAS (Uniform Federal Accessibility Standards).

A. Products of the following manufacturers will be considered acceptable.
    1. Butts: Hager, Lawrence, Soss, Stanley. All doors to have ball bearing hinges
    2. Locksets, Passages, Entries: Schlage, Corbin, Russwin
    3. Panic Devices: Corbin, Russwin, Yale.
    4. Door Closers: Norton 7500 Series, Rixson 2020 Series, Yale 4400 Series.
    5. Door Trim: Rockwood, Baldwin, Brookline.

6. Door Stops and Miscellaneous Holders: Rockwood, Baldwin, Brookline.
7. Thresholds and Weather stripping: Pemko, Reese, Zero.

2.2 FASTENINGS

A. Furnish all necessary screws, bolts, and other fasteners of suitable size and type to properly anchor the hardware for long life under hard use.
B. Furnish fastenings, where necessary, with expansion shields, toggle bolts, sex bolts, and other anchors, according to the material to which hardware is to be applied and the recommendations of the hardware manufacturer.
C. Furnish fastenings compatible with both hardware and substrate material and, if exposed, matching hardware finish.

2.3 FINISHES

A. In general, furnish satin chrome BHMA 626 or 651. Stainless steel BHMA 630 may be provided at supplier's option.
B. Provide mill finished aluminum thresholds and weather-strip.
C. Provide plastic laminate kick plates in color as selected by Architect.

2.4 KEYING

A. Door Locks: 6 pin tumbler, keyed 5 pin. Keyed in like groups; Grand master keyed.
B. Supply 3 change keys for each lock and 4 master keys.
C. Identification: Factory stamp permanent keys “DO NOT DUPLICATE”. Identify permanent keys with tags and transmit directly to Owner by registered mail or receipted personal delivery.
D. Furnish four keys per keyed alike set and two keys each for other locks.
E. Provide 2 new master keys.
F. Verify keying schedule with owner and/or construction manager.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames: by DHI", except as otherwise required by ADAAG, UFAS or directed by Architect.
B. Install each hardware item in compliance with manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted and finished, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified. Do not install surface-mounted items until finishes have been completed on substrate.
C. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
E. Set thresholds in full bed of butyl-rubber or polyisobutylene mastic sealant.

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.
B. Clean adjacent surfaces soiled by hardware installation.

3.3 HARDWARE SETS: Furnish in the amounts as indicated on drawings or as required for complete and operable facility.

END OF SECTION

SECTION 08800

GLASS AND GLAZING

PART 1 - GENERAL

1.1 SCOPE: Provide glass and glazing, complete.

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
- D. Toilet Accessories, Section 10800

1.3 QUALITY ASSURANCE: Provide safety glass with etched or ceramic fired permanent identification visible on glass when glazed. Label each piece of glass indicating compliance with requirements. Do not remove labels prior to installation. Provide 10 year seal warranty for insulated glazing.

1.4 SUBMITTALS: Comply with Section 01300. Product Data: Submit copy of manufacturer's specifications and installation instructions for each type of glass and glazing material. Include test data or certification substantiating that glass complies with specified requirements.

1.5 PROTECTION: Protect glass surfaces and edges at all times during the construction period. Keep glass free from contact or contamination by materials capable of staining glass.

PART 2 - PRODUCTS

2.1 GLASS: ASTM C 1036, of the types, classes, and forms specified. See drawings and Door and Window Schedules for locations.
- A. Float glass: Type I, Class 1 (transparent), Quality q3 (glazing select); 1/4" thick, unless otherwise specified.
- B. Tinted Glass: Type I, Class 3 (light reducing), Quality q3 (glazing select); tinting on all exterior glass or as shown on drawings.
- C. 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.
- D. Insulated glazing shall be double 1/4" thick glass with 1/2" air space (1" total thickness), tempered and tinted where shown on plans.
- E. Mirrored glass with sanded edges, 1/4” thick. See drawings for sizes & locations.

2.2 GLAZING MATERIALS: Provide materials with proven record of compatibility with surfaces contacted in installation.
- A. Glazing Sealants: Tremco "Roglaze", Pecora "836", or Sonneborn "Omniglaze".
- B. Glazing Gaskets: Structural rubber, molded neoprene, or cellular neoprene as recommended by manufacturer of glazing system.
- C. Glazing Tape: Dapp "Butyl Rubber Tape" or Tremco "440".
- D. 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.

PART 3 - EXECUTION

3.1 INSTALLATION: Comply with recommendations of glass manufacturer and manufacturers of sealants and other glazing materials, unless otherwise indicated or specified, including preparation of surfaces.

A. Clean channel surfaces and prime as recommended by sealant manufacturer.

B. Cut glass to size as required for measured opening, provide adequate edge clearance and glass bite all around. Cut prior to tempering.

C. Do not install sheets which have edge damage or face imperfections.

D. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during the construction period.

3.2 CURING: 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

SECTION 09260

GYPSUM WALLBOARD

PART 1 GENERAL

1.1 SCOPE: Provide gypsum wallboard work, complete, including partitions, walls, ceilings, and metal trim and accessories.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS
- A. Painting: Section 09900.

1.3 SUBMITTALS: Comply with Section 01300.
- A. Submit proposed layout for all expansion and control joint locations.

1.4 QUALITY ASSURANCE:
- A. Allowable tolerances; 1/16" offsets between planes of board faces, and 1/4" in 8 ft. for plumb, level, warp and bow.

1.5 DELIVERY, STORAGE AND PRODUCT HANDLING: Deliver materials in original packages, containers and bundles, fully identified with manufacturer's name, brand, type and grade. Store in dry, well ventilated space, protected from the weather under cover and off the ground. Stack flat to prevent sagging. handle to prevent damage to edges, ends and surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS: U.S. Gypsum system is specified. Equivalent systems of Gold bond and Georgia Pacific are acceptable.

2.2 MATERIALS
- A. Studs, Channels and Runners: Roll-formed, 25 gage, unless otherwise indicated, electro-galvanized steel. 1-1/2" carrying channels and 7/8" furring channels. Stud sizes 6", 3-5/8", 2-1/2", 1-5/8", as indicated. Punch holes near each end of the stud to facilitate installation of horizontal electrical wiring or conduit; punch as required for piping.
- B. Hangers: 8 gage galvanized soft annealed wire.
- C. Tie Wire: 18 gage galvanized soft annealed wire.
- D. Gypsum wall board: 5/8" Sheetrock Firecode (Type X) with tapered edges (ASTM C36).
- E. Gypsum sheathing: 5/8" gypsum sheathing type 'X'(ASTM C79) ‘Densglas Gold’ by Georgia Pacific or other approved equal.
- F. Trim Accessories: 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 nailing or stapling, and beaded for concealment of flanges in joint compound. Provide all corner beads, edge trim-beads, and control joint beads, types as indicated, and as required by project conditions.
- G. Fasteners:
  1. Self-drilling, self-tapping screws for power driving with special head design for gypsum board attachment (Type S), producing surface depression for proper concealment; 1" long for single layer, 1-5/8" long for double layer.
  2. Provide other fasteners as required by project conditions as recommended by manufacturer.
- H. Laminating Adhesive: Type recommended by gypsum wallboard manufacturer.
- I. Acoustical Sealant: U.S.G. Acoustical Sealant, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 840, GA-201, GA-216, GA-600, manufacturer's instructions and as specified and indicated on

the drawings.

B. Partitions: provide partition assemblies as indicated; space studs 16" o.c. Provide floor and ceiling runner designed to hold and align studs. Provide additional studs at door frames.
   1. Typical partition: 5/8" gypsum board fastened to each side of 3-5/8" wood or metal studs.

C. Gypsum board Ceilings: 5/8" gypsum board on bottom of framing as indicated on drawings.
   1. At fire rated assemblies, use number of layers as indicated or as required by fire rating indicated; conform to tested assemblies indicated.

D. Application: Except where specified otherwise:
   1. Install gypsum board panels with long dimension perpendicular to framing with single panels in longest length available.
   2. Provide casing beads where edges of gypsum board meet dissimilar materials.
   3. Space screws 16" o.c. for walls and 12" o.c. for ceilings for single layer. Space screws 24" o.c. for walls and 16" o.c. for ceiling for base layer of double layer (both layers mechanically attached) and 16" o.c. for walls and 12" o.c. for ceilings for face layer.
   4. Cooperate with the carpenter in placing of backing and blocking required as backing for all millwork, fixtures, fittings, and accessories. Reinforce and brace studs in partitions supporting fixtures, to provide firm backing and prevent deflection of the wall.
   5. Brace studs in compliance with manufacturer's recommendations for wall height, stud spacing, and other job conditions indicated.
   6. Arrange gypsum board joints on opposite sides of partitions to occur on different studs.
   7. For gypsum board ceilings with perimeter relief joints, install expansion/control joints in ceilings exceeding 2500 sq. ft. in area. Do not exceed a distance of 50', in either direction between ceiling control joints. Install a control joint where ceiling framing or furring changes direction.
   8. For gypsum board ceilings without perimeter relief joints, install expansion/control joints in ceilings exceeding 900 sq. ft. in area. Do not exceed a distance of 30', in either direction between ceiling control joints. Install a control joint where ceiling framing or furring changes direction.
   9. Install expansion/control joints in walls above all doorway and window jambs where directed by Architect.
   10. Do not exceed a distance of 30' between control joints in walls.
   11. Treat all internal angles formed by the intersection of either wallboard surfaces with metal trim and/or a taped joint system as indicated or required.
   12. Treat all vertical and horizontal external corners with metal bead corner reinforcement applied in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09510

SUSPENDED ACOUSTIC CEILINGS

PART 1 - GENERAL

1.1 SCOPE: Provide acoustical ceilings, complete, including elements of the suspension system, trim, and facilities required for the support and attachment of lighting fixtures, air diffusers and grilles.

1.2 SUBMITTALS: Comply with Section 01300

A. Shop Drawings: Submit shop drawings indicating location of ceiling units and items of work which are to be coordinated with ceilings, and framing and support details for work supported by suspension system.

B. Samples: Submit full range 12" X 12" color samples of acoustical material and color samples of main runner, cross tee, and wall molding for Architect's selection.

C. Warranty: Submit executed warranty.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING: Deliver acoustical units in manufacturer's original unopened packages, fully identified with type, finish, performance data and compliance labels. Handle and store in accordance with manufacturer's instructions and recommendations.

1.4 JOB CONDITIONS: Do not install interior acoustical units until space has been enclosed and is weather tight, until wet work has been completed and is dry, until work above ceiling is complete, and until temperature and humidity conditions will be continuously maintained at values near those indicated for final occupancy.

1.5 WARRANTY: Provide manufacturer's 10 year limited warranty of dimensional stability against sagging, warping, or shrinking and de-lamination of finished surface of acoustical lay-in panels.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING MATERIALS: Provide fire rated acoustical ceiling/grid materials conforming to ASTM C 635 where fire rated assemblies are indicated on the drawings.

A. US Gypsum Company acoustical ceiling products are specified, equivalent products by Armstrong are acceptable.

B. LAY-IN ACOUSTICAL PANELS: Minimum Class C Flame resistance, generally panels 2'x2' in the Auditorium and 2'x4' elsewhere, refer to drawings for panel size locations.

1. General: US Gypsum Company, 'Aurotone' SLT style with standard 'DX' grid. Pattern as indicated on the drawings.
2. Vinyl face: US Gypsum Company, gypsum lay-in panels with stippled vinyl face, with 'DXLA' grid in kitchens and shower areas.
3. Storage, mechanical and closet areas: US Gypsum Company, 'Aurotone' style, with standard 'DX' grid. Pattern as indicated on the drawings.

C. SUSPENSION SYSTEM MATERIALS: Provide suspension system materials as manufactured by USG Interiors, Inc., Donn Ceiling Suspension Systems, Chicago Metallic Corp. or National Rolling Mills.

1. Attachment Devices: Type recommended by suspension system manufacturer for attachment or anchorage of ceiling hangers to structure above ceiling, sized for not less than 5 times the hanger design load for the structural classification indicated.
2. Hanger Wire: Minimum No. 12 gage, galvanized annealed steel wire.
3. Exposed Grid System: As specified above, color as selected, intermediate duty structural classification.
4. Wall Moldings: Provide wall moldings, of types and profiles indicated or required by job conditions, of same material and finish as suspension system.
5. Provide wind hold-down clips at vestibules and all locations where sudden air pressure changes due to opening or closing of doors may unseat lay-in panels.
6. 4” batt insulation, 2’ x 4’ batts for sound R-11 where indicated on drawings
7. 6” batt insulation, 2’x 4’ batts, R-19 where indicated on the drawings

PART 3 - EXECUTION

3.1 INSTALLATION AND WORKMANSHIP: Install mechanical suspension system and acoustical units in compliance with ASTM C 635 and with manufacturer's directions.

A. Install in the patterns indicated on the drawings in such a manner as to permit border units of the greatest possible size, unless otherwise indicated on the drawings.

B. Refer to Architectural Reflected Ceiling/Lighting Plan for the locations of lighting fixtures, air supply and return diffusers, grilles, and registers, which will be installed in the ceilings, and which will replace and/or pierce the acoustical unit. Refer to electrical and mechanical drawings for quantities.

C. Exposed Grid:

1. Install acoustical ceiling suspension system level and true to line, with neat and close-fitting joints between spliced and intersecting members. Grid to be square, and ends and cross tees tightly butted, and faces in the same plane. Do not rest flanges of the cross tees on the flanges of the main runners.

2. Neatly and accurately cut and place acoustical panels to fit snugly into the main and cross tees, with no space between the bottom of the acoustical panels and grid system, and without gaps or panel edges showing in the finished installation.

3. Provide Owner with one extra full box of each type of ceiling panel provided to be used as spares.

3.2 CLEANING: Clean soiled or discolored acoustical units, trim, moldings, and suspension members after installation. Touch up scratches, abrasions, voids, and other defects in painted surfaces. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09645
ARCHITECTURAL SPECIFICATIONS FOR INDOOR RESILIENT ATHLETIC SURFACING

PART 1 – GENERAL

1.1 *SECTION INCLUDES*

A. Supply and installation of the indoor resilient multipurpose surfacing
B. Application of the game lines

1.2 SUBMITTALS

A. Product Data:
Manufacturer's promotional brochures, specifications and installation instructions

B. Samples:
1. Submit for selection and approval three (3) sets of the indoor resilient multipurpose surfacing, manufacturer's brochures and sample boards. To be included are actual samples of all of the available colors, textures and styles.
2. Submit color samples of all the available game line paint colors for selection and approval.

C. Closeout Submittals:
1. Submit three (3) copies of the indoor resilient multipurpose surfacing and manufacturer's maintenance instructions.
2. Submit three (3) copies of the material and installation warranties as specified.

1.3 *QUALITY ASSURANCE*

A. Qualifications:
1. The indoor resilient multipurpose surfacing shall have been actively marketed for a minimum of ten (10) years.
2. The indoor resilient multipurpose surfacing shall be manufactured in an ISO 9001 certified plant.
3. The indoor resilient multipurpose surfacing shall be manufactured in an ISO 14001 certified plant.
4. The indoor resilient multipurpose surfacing supplier shall be an established firm experienced in the field and appointed as a distributor by the manufacturer of the indoor resilient multipurpose surfacing.
5. The installer of the indoor resilient multipurpose surfacing shall have a minimum of five (5) years experience in the field installing the specified indoor resilient multipurpose surfacing and have worked on at least five (5) projects of similar size, type and complexity.

B. Certifications:
1. Installer to submit the indoor resilient athletic surfacing manufacturer's or distributor's certification attesting that they are an approved installer of the indoor resilient multipurpose surfacing.
2. The indoor resilient multipurpose surfacing manufacturer to submit official ISO 9001 certification for the facility in which the indoor resilient multipurpose surfacing is manufactured.

3. The indoor resilient multipurpose surfacing manufacturer to submit official ISO 14001 certification for the facility in which the indoor resilient multipurpose surfacing is manufactured.

C. Testing:

Submit shock absorption (force reduction) test results of the indoor resilient multipurpose surfacing when tested in accordance with the DIN V 18032-2 (April 2001) standard and certified by an independent testing laboratory approved to perform such testing.

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivery:

Material shall not be delivered until all related work is in place and finished and/or proper storage facilities and conditions can be provided and guaranteed stable according to Gerflor's recommendations.

B. Storage:

Store the material in a secure, clean and dry location. Maintain temperature between 55° and 85° Fahrenheit. Store the indoor resilient athletic surfacing rolls in an upright position on a smooth flat surface immediately upon delivery to jobsite.

1.5 *PROJECT/SITE CONDITIONS*

A. It is the responsibility of the general contractor/construction manager to maintain project/site conditions acceptable for the installation of the indoor resilient multipurpose flooring.
B. The area in which the indoor resilient multipurpose surfacing will be installed shall be dry and weather tight. Permanent heat, light and ventilation shall be installed and operable.
C. All other trades shall have completed their work prior to the installation of the resilient athletic flooring. The general contractor or Construction Manager shall maintain a secure and clean working environment before, during and after the installation. Suspension of other trades' work may be authorized providing their work will not damage the new flooring.
D. Maintain a stable room temperature of at least 65°F for a minimum of one (1) week prior to, during and thereafter installation.
E. An effective low-permeance vapor barrier is placed directly beneath the concrete subfloor. For "on" or "below grade" installations, it is recommended to provide a permanent vapor barrier resistant to long term hydrostatic pressure/moisture exposure. Protrusions should be sealed to prevent moisture migration into the slab. Moisture should not be allowed to enter the slab after the completed construction.
F. Concrete subfloor surface pH level within the 7 to 8.5 range.
G. Concrete subfloor moisture content less than five (5) pounds/1,000 sq.ft./24 hours when tested using calcium chloride per ASTM F 1869.
H. Concrete subfloor should be no greater than 1/8" within a 10 ft diameter. This tolerance can be measured in accordance with ASTM E1155. A specified (F_F) of 50 and an (F_L) of 30 should reach this degree of floor flatness and floor level. There is no numerical correlation between F

numbers and the deviation from the straight edge, however the above specified numbers should achieve a flat floor with minimal deviation in the slab. Reference ACI 117 and ACI 302.1R. The general contractor should provide a certificate of compliance with the above recommendations.

I. Concrete subfloor must be clean and free of all foreign materials or objects including, but not limited to, curing compounds and sealers.

J. Fill cracks, grooves, voids, depressions, and other minor imperfections with Ardex (or equal) cement-based patching/leveling compounds. Follow the manufacturer's directions. Moveable joints must be treated utilizing specific transitioning joint devices depending upon the architect's recommendations. Follow current ASTM F710 guidelines for the preparation of concrete slabs to receive resilient flooring.

K. Refer to ACI 302.2R "Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" for concrete design.

L. Concrete slab shall be fortified with continual steel reinforcement.

1.6 *WARRANTY*

A. Materials:
The indoor resilient athletic surfacing shall be covered against manufacturing defects by a two (2) year written, limited warranty. The manufacturer of the indoor resilient multipurpose surfacing must provide this warranty.

B. Installation:
The installation of the indoor resilient multipurpose surfacing shall be covered against poor workmanship and faulty installation by a two (2) year written, limited warranty provided by the manufacturer-approved installer.

C. Wear:
The indoor resilient multipurpose surfacing shall be covered against wear through the wear layer by a fifteen (15) year written, limited warranty. This warranty must be provided by the manufacturer of the indoor resilient athletic surfacing.

1.7 ADDITIONAL MATERIALS

Furnish to the owner additional materials containing a total of at least 1% of each different color or design of the indoor resilient athletic surfacing used on the project.

1.8 *LEED™ CERTIFICATION*

The indoor resilient athletic surfacing should be able to help this facility to achieve up to seven points towards *LEED™ certification.*

LEED categories positively affected by the indoor resilient athletic surfacing

- Water Efficiency credit reference WE 3.1 & 3.2 Points Attainable 1- 2
- Materials & Resources credit reference MR 4.1 & 4.2 Points Attainable 1- 2
- Indoor Environmental Quality credit reference EQ 4.1 & 4.2 Points Attainable 1
- Design Innovation credit reference ID 1.1 & 1.4 Points Attainable 1- 2

PART 2 - PRODUCTS

2.1 MANUFACTURERS

The basis of the design for the indoor resilient multipurpose surfacing is Taraflex Multi-Use 3.0 and 5.0 as manufactured by Gerflor. All other installation accessories and related components must be either made or approved by the indoor resilient athletic surfacing manufacturer. Other products may be approved as equal if deemed qualified and submitted in accordance with the General Conditions.

2.2 MATERIALS. (Taraflex 3.0)

A. Indoor Resilient Multipurpose Surfacing:

Product shall consist of a 2.1 mm thick over 95% pure polyvinyl chloride (PVC) wear layer combined with pure PVC-CXP™ vertically elongated closed-cell foam cushion backing or VHD™ high density foam backing. (AED and Wood designs) D-Max™ multi-layer surface complex shall be reinforced with a non-woven fiberglass mesh placed between the wear layer and the foam backing to improve dimensional stability. Sanosol®, a fungistatic and bacteriostatic treatment shall be incorporated throughout the entire thickness. The wear surface shall be Triple-Action Protecsol®, UV cured, factory applied, and permanently bonded to the surface of the resilient flooring. Field application of the surface treatment and/or Multi-Durometer products laminated or constructed in the field are unacceptable.

1. Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

Dependent upon design	Width	.....	4’11” (1.50m) Design/Solid 6’6 ‘ (2.0 m) AED
	Length	.....	86’6” Wood Designs 98’5” Solid Color Design 75’5” AED Design
	Total Thickness	.....	3.0 mm / 0.12”
	Static Load Limit ASTM F970 modified	.....	<200 p.s.i.
	Dynamic Load Limit (N) DIN V 18032-2 (April 2001)	.....	>1000 N
	Chemical Resistance ASTM D543	.....	Excellent
	Fungus Resistance ASTM G21	.....	Complete
	Critical Radiant Flux ASTM E648	.....	Class 1
	Sound Insulation ISO 717/2	.....	>15 dB

Ball Rebound DIN V 18032-2 (April 2001)	……	>90%
Force reduction (shock absorption) DIN V 18032-2 (April 2001)	……	16%

2.3 MATERIALS (Teraflex 5.0)

A. Indoor Resilient Multipurpose Surfacing:

Product shall consist of a 2.1 mm thick over 95% pure polyvinyl chloride (PVC) wear layer combined with pure PVC-CXP™ vertically elongated closed-cell foam cushion backing. D-Max™ multi-layer surface complex shall be reinforced with a non-woven fiberglass mesh placed between the wear layer and the foam backing to improve dimensional stability. Sanosol®, a fungistatic and bacteriostatic treatment shall be incorporated throughout the entire thickness. The wear surface shall be Triple-Action Protecsol®, UV cured, factory applied, and permanently bonded to the surface of the resilient flooring. Field application of the surface treatment and/or Multi-Durometer products laminated or constructed in the field are unacceptable.

1. Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

Dependent upon design Width	…….	4’11” (1.50m)
Length	…….	86’6” Wood Designs 98’5” Solid Color Design
Total Thickness	…….	5.0 mm / 0.20”
Static Load Limit ASTM F970 modified	…….	<200 p.s.i.
Dynamic Load Limit (N) DIN V 18032-2 (April 2001)	…….	>1000 N
Chemical Resistance ASTM D543	……	Excellent
Fungus Resistance ASTM G21	…….	Complete
Critical Radiant Flux ASTM E648	…….	Class 1
Sound Insulation ISO 717/2	…….	>18 dB
Ball Rebound DIN V 18032-2 (April 2001)	…….	>90%
Force reduction (shock absorption) DIN V 18032-2 (April 2001)	…….	27%

1. Color: As available from the indoor resilient athletic surfacing manufacturer’s standard range.
2. Hardwood Design Series: A wood look design as available from the

indoor resilient athletic surfacing manufacturer's standard range including Maple Design and Oak Design

4. Texture: Slightly grained (Hardwood Design Series) or textured (Solid Colors)

B. Welding Rod:
As supplied by the indoor resilient athletic surfacing manufacturer or supplier. Color to blend with the indoor resilient athletic surfacing color or design. All seams shall be welded to create a monolithic and impermeable surface.

C. Adhesive:
As approved by the indoor resilient athletic surfacing manufacturer.

D. Game Line Paint Primer:
As approved by the indoor resilient athletic surfacing manufacturer.

E. Game Line Paint:
As approved by the indoor resilient athletic surfacing manufacturer. Colors are to be selected from the manufacturer's standard range.

PART 3 - EXECUTION

3.1 *EXAMINATION*

A. It is the responsibility of the general contractor/construction manager to ensure that project/site conditions are acceptable for the installation of the indoor resilient athletic flooring.

B. Verify that the area in which the indoor resilient athletic surfacing will be installed is dry and weather tight. Verify that permanent heat, light and ventilation is installed and operable.

C. Verify that all other work that could cause damage, dirt and dust or interrupt the normal pace of the indoor resilient athletic flooring installation is completed or suspended.

D. Verify that there is a stable room temperature of at least 65°F.

E. Verify that there are no foreign materials or objects on the subfloor and that the subfloor is clean and ready for installation.

F. Review and document the results of the moisture tests to verify that the moisture evaporative rate is less than five (5) pounds/1,000 sq.ft./24 hours per ASTM F1869.

G. Verify that the concrete subfloor surface pH level is within the 7 - 8.5 range.

H. Document the results indicating the slab is within manufacturer's tolerances for slab deviation.

3.2 PREPARATION OF SURFACES

A. Sand the entire surface of the concrete slab.
B. Sweep the concrete slab so as to remove all dirt and dust. If a sweeping compound is to be used it must be a sweeping compound that does not contain oil or other items that may inhibit the adhesive bond.

3.3 *INSTALLATION*

A. The installation area shall be closed to all traffic and activity for a period to be set by the indoor resilient athletic surfacing installer. The indoor resilient athletic surfacing installation shall not begin until the installer is familiar with the existing conditions.
B. All necessary precautions should be taken to minimize noise, smell, dust, the use of hazardous materials and any other items that may inconvenience others.
C. Install the indoor resilient athletic surfacing in strict accordance with the indoor resilient athletic surfacing manufacturer's written instructions.
D. Install the indoor resilient athletic surfacing minimizing cross seams. Provide a seam diagram during the submittal process for approval prior to installation.
E. Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer's instructions.
F. Install appropriate threshold plates or transition strips where necessary.

3.4 CLEANING

A. Remove all unused materials, tools, and equipment and dispose of any debris properly. Clean the indoor resilient athletic surfacing in accordance with the manufacturer's instructions.

3.5 *PROTECTION*

If so required, protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer until acceptance of work by the customer or their authorized representative.

3.6 RELATED STANDARDS AND GUIDELINES

A. ASTM F1869 "Standard Test Method for Measuring Moisture Evaporation Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"
B. ASTM F2170 "Standard Test Method for Determining Relative Humidity In Concrete Floor Slabs Using In-Situ Probes"
C. ASTM F710 "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring"
D. ACI 302.2R-06 "Guideline for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials"

END OF SECTION Section 09645

SECTION 09680

CARPET

PART 1 GENERAL

1.1 SCOPE: Provide carpeting, complete, including carpet, adhesive, seaming, anchorage, edge treatment, and accessories, as indicated.

1.2 SUBMITTALS: Comply with Section 01300

A. Samples: Submit minimum 18" X 27" carpet squares in manufacturer's standard colors and 6" length of edge guards.

B. Maintenance Materials: deliver usable scrap materials to Owner's designated storage space as directed, properly packed/protected and identified.

1.3 QUALITY ASSURANCE:

A. Installation: Use thoroughly trained and experienced carpet installers who are completely familiar with materials specified and manufacturer's recommended methods of installation for specified materials.

1.4 PRODUCT DELIVERY AND STORAGE: Deliver materials in protective wrapping, and store inside, protected from weather, moisture and soiling.

PART 2 PRODUCTS

2.1 CARPET

A. Floor carpet shall be minimum 28 oz. 100% solution dyed nylon, tufted loop pile graphic, 1/10 gage, 10 stitches per inch, unitary back. Mohawk 'Endeavor' or other approved equal. Color and pattern as selected by Architect.

B. Wall carpet shall be a needle point or V-lock carpet with resilient top cap trim equal to 'Mercer 225'.

2.2 CARPET ACCESSORIES

A. Carpet Edge Guard: extruded or molded vinyl or rubber carpet edge guard of size and profile indicated, in colors selected by Architect from manufacturer's standard colors.

B. Installation Adhesive: Water-resistant, non-staining as recommended by carpet manufacturer, which complies with requirements for installed carpet.

C. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges of carpet backing (and bottom of face pile) at seams, to form secure seams and prevent pile loss at seams.

D. Miscellaneous Materials: As recommended by manufacturers of carpet and other carpeting products; selected by installer to meet project circumstances and requirements.

E. Carpet & Tile Joiner: Mercer #15, or approved equal, with 1/4" carpet undercut. Colors as selected by the owner and/or Construction Manager from full range of colors.

PART 3 EXECUTION

3.1 EXAMINATION: Examine substrates and conditions under which carpeting is to be installed. Do not proceed with installation of carpeting until unsatisfactory conditions have been corrected. Do not install carpet over concrete with either excess moisture or dust producing surface which is not adequately sealed.

3.2 PREPARATION

A. Repair minor holes, cracks, depressions, and rough areas using material recommended by carpet or adhesive mfr.

B. Clean surfaces to be carpeted immediately prior to installation of carpeting materials, by vacuum cleaning.

C. Dimensions: prior to start of carpet installation, check critical dimensions of spaces to be carpeted, to ensure that planned use of materials will fulfill requirements, including locations for seam joints, and

edging.

3.3 INSTALLATION: Comply with manufacturer's recommendations.

A. Lay carpet to provide as few seams as possible. Make seams invisible. Cross seams are not acceptable. Maintain direction of pattern and texture. Do not seam weft to warp, except as specifically indicated for a direction change. At doors, enter seams under doors; do not place seams in traffic direction at doorway.

B. Extend carpet under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.

C. Provide cut-outs where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.

D. Install carpet edge guard at locations where edge of carpet is exposed to traffic, except where another device, such as a threshold is indicated. Anchor edge guard to substrate.

3.4 GLUE-DOWN INSTALLATION

A. Apply primer to entire substrate where necessary for adequate bond of carpet.

B. Fit sections of carpet into each room or space prior to application of adhesive. Trim off mill edges unless carpet has been pre-trimmed. maintain straight seams, true to lines of building.

C. Apply seaming cement on cut edges of carpet at seams, without being in evidence on face of carpet but securing base of pile at cut.

D. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll lightly to eliminate air pockets and ensure uniform total-area bond of carpet to substrate. Remove adhesive promptly from face of carpet.

3.5 CLEANING: Remove and dispose of unusable scraps. Vacuum carpet using commercial machine with rotating agitator or beater nozzles. Remove spots, and replace carpet where spots can not be removed. Remove protruding face yarn using sharp scissors.

END OF SECTION

SECTION 09900

PAINTING

PART 1 GENERAL

1.1 SCOPE

A. Provide painting and finishing of all interior and exterior items and surfaces throughout the project, except as otherwise indicated. Provide field painting of all hangers, exposed steel and iron work, of all primed metal surfaces and exposed-to-view prefinished metal surfaces of items, as required to match adjacent surfaces, and equipment installed under mechanical and electrical work. Refer to those respective sections for painting requirements. Provide touch-up of pre-finished items as required to match original finish. Provide field painting of all electrical conduit, piping, etc where such is installed exposed in a finished area.

B. Do not paint brick, water repellent coating, acoustical ceilings, laminated plastic, pre-finished items except as noted above, and surfaces to receive wall covering and other decorative coverings.

1.2 SUBMITTALS: Comply with Section 01300

A. Paint Schedule: Submit paint schedule listing each material cross-referenced to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.

B. Samples: Submit samples of finishes type and color on specified materials for verification.

1.3 DELIVERY AND STORAGE: Deliver materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Provide paints, enamels, stains, varnishes, and ad mixtures of first line quality as manufactured by Sherwin Williams, Pratt and Lambert, Glidden, Benjamin Moore, and Pittsburgh, except where specified otherwise.

2.2 MATERIALS: See paragraph 3.5, SCHEDULE OF PAINT TREATMENT for materials. All finish coats shall contain mildewcides. Grind in the factory all exterior colors and interior deep tone colors. Shop mixing is not permitted. Colors as selected by the Architect, and subject to modification on the job at the Architect's discretion.

PART 3 EXECUTION

3.1 EXAMINATION: Examine the areas and conditions under which painting work is to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected. Starting of painting work will be construed as acceptance of the surfaces within any particular area.

3.2 SURFACE PREPARATION: Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified. Remove all hardware, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Reinstall the removed items by workmen skilled in the trades involved, after painting is completed.

A. Cementitious Materials: Prepare cementitious surfaces to be painted by removing all, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint.

B. Wood: Clean wood surfaces to be painted of all dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those surfaces exposed to view, and dust off. Prime, stain, or seal wood required to be job painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, etc. Scrape and clean small , dry seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before application of the priming coat. After priming, fill holes and

imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

C. Gypsum Wall Board: Treat all joints, nail heads and other depressions in the surface of the wallboard, in accordance with the recommended manner, with a taped joint system by the gypsum wallboard manufacturer. Do not paint gypsum wallboard work until joints are dry.

D. Ferrous Metals: Touch-up shop-applied prime coats which have damaged or bare areas. Wire-brush, solvent clean, and touch up with the same primer as the shop coat.

E. Galvanized Surfaces: Clean free of oil and surface contaminates with an acceptable non-petroleum based solvent.

3.3 APPLICATION

A. Apply paint by brush, roller, spray, or other acceptable practice in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep wool as recommended by the manufacturer for material and texture required.

B. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sand paper, or rub surfaces with pumice stone where required to produce an even smooth surface in accordance with the coating manufacturer's directions.

C. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.

D. Give special attention to ensure that all surfaces, including edges corners, crevices, welds, and exposed fasteners receive a film thickness equivalent of that of flat surfaces.

3.4 CLEAN-UP: Thoroughly clean all spots, smears, spills, etc., remove from the site all discarded paint materials, rubbish cans and rags at the end of each work day.

SCHEDULE OF PAINT TREATMENTS (Sherwin Williams paints or approved equal)

No.	Location	Coats	Materials	Related Notes
1.	Ext. & Int. ferrous metals	3	1st coat – Kem Kromik Primer 2- coats – Ind. Enamel – B54 Series -2.0-3.0 mdft.	Shop priming is spec'd under the respective metal section.
2.	Ext. & int. galv. metals	3	Pre-treatment Chemical wash. 1st Coat: DTM Prim/Finish-B66W1- 2.5-5.0 mdft. 2-Coats DTM, Acrylic Coat-B66 Series -2.5-4.0 mdft.	Shop priming is spec'd under the respective metal section.
3	Ext. Plywood	3	1st Coat: A-100 Ext. Latx Prim – B42 Series-1,4 mdft 2-Coats: A-100 Satin Acrylic Latx-A82 Series -1.3 mdft	
4	Int. wood & plywood	3	1st Coat: WoodClassics Int. Stain – B48 Series 2-Coats: WoodClassics Polyurethane Varnish-1.7 mdft	
5	Int. CMU	3	1st Coat: PrepRite Block Filler B25W25 2-Coats: Promar 200 Latx Semi-Gloss enamel or 2-Coats: Waterbase Catlzed Epoxy-B70 Ser.- 3.0 mdft	
6	Ext. CMU	3	1st Coat: PrepRite Block Filler B25W25 2-Coats: SuperPaint Satin-A89 Series, 2.5-3.0 mdft	
7	Int. GypBoard	3	1st Coat: PrepRite Latx Primer-B28W200-1.1 mdft 2-Coats: Promar Latx Semi-gloss Enamel-B31W201 or 2-Coats: Waterbase Catlzed Epoxy-B70 Ser.- 3.0 mdft	

END OF SECTION

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 10155

TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SCOPE: Provide toilet compartments, complete, including urinal screens and shower compartments.

1.2 SUBMITTALS: Comply with Section 01300

A. Product Submit manufacturer's detailed technical data for materials, fabrication, and installation.

B. Shop Drawings: Submit shop drawings for the fabrication and erection of toilet compartment assemblies not fully described by manufacturer's data. Show all anchorages, thicknesses of panels, hardware, fittings and fastenings. Submit setting drawings, templates and instructions for the installation of anchorage devices built into other work.

C. Samples: Submit full range of color samples for Architect's selection.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Accurate Partitions Corporation

B. American Sanitary Partition Corporation

C. Bobrick Washroom Equipment, Inc.

D. Flush-Metal Partition Corporation

E. General Partitions Manufacturing Corporation

F. Global Steel Products Corporation

G. Knickerbocker Partition Corporation

H. Sanymetal Products

2.2 TYPE: Flush construction floor mounted overhead braced type partitions and compartments and wall hung urinal screens.

A. Door, Panel and Pilaster construction: Sheet steel ASTM A653/A653M formed with reinforced core, baked enamel finish, in standard color as selected by the Architect.

B. Doors and Panels thickness: 1 inch.

C. Pilasters thickness: 1-1/4 inches.

2.3 ACCESSORIES

A. Head Rails: Hollow chrome-plated steel or aluminum tube with anti-grip profile and cast socket wall brackets.

B. Pilaster Shoes: Formed chrome-plated steel. Provide adjustment for height variations with screw jack through steel saddles.

C. Internal reinforcement: Provide for attached hardware and fittings.

D. Attachments and Bolts: Steel with heavy-duty aluminum brackets.

E. Hardware:

1. Hinges: Pivot hinges, gravity type, adjustable; two per door.
2. Latch and Keeper: Sliding type latch, door strike and keeper with rubber bumper; for each door.
3. Coat hook: Cast alloy with rubber bumper tip; mounted on door panel.
4. Pull: Provide pull handle for out-swinging door panels.

PART 3 EXECUTION

3.1 EXAMINATION

A. Field verify that opening dimensions and plumbing fixture and rough-in locations are as shown on the drawings.

B. Verify correct location of all built-in framing, anchorage, bracing and blocking.

3.2 INSTALLATION

A. Install partitions and screens rigid, straight, plumb and level, in strict accordance with manufacturer's instructions and final shop drawings.
B. Secure panels in position with manufacturer's recommended anchoring devices.
C. Secure pilaster to floor and level, plumb and tighten installation with devices furnished. Hang doors and adjust so that tops of doors are parallel with overhead-brace when doors are in closed position.
D. Provide 3/8" to 1/2" clearance between walls and panels and between walls and end pilasters.
E. Ensure that the finish floor and plumbing fixtures are installed prior to installation of partitions.

3.3 ADJUST AND CLEAN

A. Adjust and lubricate hardware for free movement and proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges of out-swinging doors to return to fully closed position.
B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

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: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units. 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 will be furnished Owner and installed by contractor.

B. Soap Dispensers will be furnished by Owner and installed by contractor.

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. Sanitary Napkin Disposal. Surface mounted with utility shelf, equal to Bobrick B-271.

E. Mirrors: Provided for in Section 08800, GLASS & GLAZING

F. Infant Diaper Changing Station: equal to Bobrick B-2210, furnish with one case of liners B-2210-40.

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: 20 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

August 6, 2009

MECHANICAL – DIVISION 15000
ELECTRICAL – DIVISON 16000

PROJECT MANUAL

FOR

YMCA

NEW CHILDCARE CENTER

WEBB CITY, MISSOURI

mfec
Malone Finkle Eckhardt & Collins, Inc.

USE OUR IMAGINATION.

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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.

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.

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: Identify valves by distinguishing numbers & letters assigned to them & listed on a valve chart, Attach a brass tag on each valve with 1" to 3/4" #10 Brass-S-Hooks. Furnish 3 copies of printed valve list showing tag letter-number, service, & location. 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"	101-0"
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 noncombustible 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.

END OF SECTION

SECTION 15300

FIRE PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Section 15050-Basic Materials and Methods
- B. Sprinkler system.

1.2 SYSTEM DESCRIPTION
- A. Sprinkler System (Wet Sprinkler System):
  1. Coverage for storage area noted.
  2. NFPA 13 light hazard occupancy requirements.

1.3 SUBMITTALS
- A. Product Data: Provide data for pipe materials used, valves, manufacturer's catalogue sheet for equipment indicating rough-in size, finish, accessories, pump type, capacity, power requirements, certified pump curves, and NPSH.
- B. Operation and Maintenance Instructions: Include components of system, servicing requirements, Record Drawings, inspection data, and parts lists.
- C. Provide an engineered set of drawings by a qualified registered engineer, licensed in the state where sprinkler is being installed.

1.4 QUALITY ASSURANCE
- A. Conform to all Local, City, & State codes as well as requirements of Fire Marshall, governmental agencies & Fire Rating Bureau having jurisdiction.
- B. Sprinkler Systems: Conform to NFPA 13 (Sprinkler Systems).
- C. Equipment and Components: Bear UL or FM label or marking.

PART 2 PRODUCTS

2.1 PIPE AND TUBE
- A. Steel Pipe: ASTM A53, ASTM A135, or ASME B36.10, Schedule 10 or 40 black or galvanized.
  1. Steel Fittings: ASME B16.9, wrought steel, butt welded; ASME B16.25, butt weld ends; ASME B16.5, steel flanges and fittings; ASME B16.11, forged steel socket welded and threaded.
  2. Cast Iron Fittings: ASME B16.1, flanges and fittings; ASME B16.4, screwed fittings.
  3. Malleable Iron Fittings: ASME B16.3, screwed type; ASTM A47.
  4. Mechanical Grooved Couplings: Malleable iron housing, "C" shaped elastomeric sealing gasket, steel bolts, nuts and washers; galvanized for galvanized pipe.
- B. Copper Tubing: ASTM B75, ASTM B88, or ASTM B251; Type M or L hard drawn.
  1. Fittings: ASME B16.18, cast bronze, or ASME B16.22, wrought copper and bronze, solder joint, pressure type.
  2. Joints: ASTM B32, solder, Grade 95Ta, or ANSI/WSA5.8, BCuP silver braze.
- C. CPVC Pipe: ASTM F442, SDR 13.5.
  1. Fittings: ASTM F438 schedule 40, or ASTM F439 schedule 80, CPVC.
  2. Joints: ASTM F493, solvent weld.
- D. Polybutylene Pipe: ASTM D3309, SDR 11.
  1. Fittings: ASTM D3309, Polybutylene.
  2. Joints: Fusion weld.
- E. Cast Iron Pipe: AWWA C151.
  1. Fittings: AWWA C110, standard thickness.
  2. Joints: AWWA C111, rubber gasket with ¾ inch diameter rods.
  3. Mechanical Grooved Couplings: Malleable iron housing, "C" shaped composition sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

2.2 GATE VALVES

A. Up to and Including 2 Inches: Bronze body, bronze trim, rising stem, hand wheel, inside screw, solid wedge or disc, solder or threaded ends.

B. Over 2 Inches: Iron body, bronze trim, rising stem, hand wheel, OS&Y, solid wedge, flanged or grooved ends.

2.3 BUTTERFLY VALVES

A. Bronze body, stainless steel disc, resilient replaceable seat, threaded ends, extended neck, hand wheel and gear drive and integral indicating device, and built-in tamper proof switch.

B. Cast or ductile iron body, chrome plated ductile iron disc, resilient replaceable EPDM seat, wafer or lug ends, extended neck, hand wheel and gear drive and integral indicating device, and built-in tamper proof switch.

2.4 CHECK VALVES

A. Up to and including 2 Inches: Bronze body & swing disc, rubber seat, threaded ends.

B. Over 2 Inches: Iron body, bronze trim, swing check with rubber disc, renewable disc & seat, flanged ends.

C. 4 Inches & Over: Iron body, bronze disc, stainless steel spring, resilient seal, threaded, wafer or flanged ends.

2.5 DRAIN VALVES

A. Bronze compression stop with hose thread nipple and cap.

B. Brass ball valve with cap and chain, ¾ inch hose thread.

2.6 SPRINKLER HEADS

A. Suspended Ceiling Type: Standard, Semi-recessed pendent type with chrome plated or enameled finish, and matching escutcheon. Sprinkler drops & head installation prior to ceiling grid installation is at sprinkler contractor's risk.

2.7 BACKFLOW PREVENTER

A. See Section 15400 Plumbing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Ream pipe and tube ends to full inside diameter. Remove burrs and bevel plain end ferrous pipe.

C. Remove scale and foreign material, inside and outside, before assembly.

D. Provide sleeves when penetrating footings, floors, & walls. Seal pipe and sleeve penetration to maintain fire resistance equivalent to fire separation required.

E. Place pipe runs to minimize obstruction to other work. Offset around ductwork. Place piping in concealed spaces above finished ceilings.

F. Provide gate valves for shut-off or isolating service. Where approved, use butterfly valves instead of gate valves.

G. Provide drain valves at main shut-off valves, low points of piping and apparatus.

H. Connect system to water source ahead of domestic water connection with [double check valve] [reduced pressure back flow preventer] assembly.

I. Protection:

1. Apply temporary tape or paper cover to ensure sprinkler heads do not receive paint finish.
2. Ensure concealed sprinkler head cover plates do not receive field paint finish.
3. Wire guards at following locations where subject to damage-under stairs, ducts, equipment, etc. or where clearance is less than 7'-8" and/or where required by approving agency.

J. Flush entire piping system of foreign matter.

K. Hydrostatically test entire system.

L. Install wet fire, sprinkler lines on the warm side of the vapor barrier of the building's insulation envelope. Conceal all pipe in mechanical chases, plenum, mechanical rooms, or in dropped soffits. Do not install wet lines in unheated attic spaces or in exterior walls. Sprinkler contractor to coordinate work with insulation contractor to assure location of insulation envelope. Notify the Architect promptly of any difficulties in accomplishing this. Any deviation from this will be grounds for rejection of work.

M. Fire seal the space around lines that pass through smoke partitions, corridor walls, & fire rated assemblies, using a non-combustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finish. See Section 07270.

N. Substantially support piping from building structure, using only approved type hangers, anchors, inserts, studs, etc. in accordance with recommendations set forth in current issue of NFPA 13.

O. Provide other materials not specifically described but required for a complete & proper installation, as selected by the Contractor subject to the approval of the Architect.

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 – BY OWNER

A. If required and subject to the authority having jurisdiction, provide reinforced precast concrete 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: 2" diameter for all lines 2" or less, & 4" diameter for all lines larger than 2` diameter.
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 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.
C. Kitchen Hood Exhaust Ductwork: Fabricate in accordance with NFPA 96 using stainless steel ductwork.

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 TAURNING 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.

2.11 FIRE PROOFING INSULATION

A. Equal “FireMaster” Duct Wrap Blanket of refractory ceramic fiber encapsulated in aluminum foil scrim, 1 ½” thickness, UL-classified, non-combustible, 2300 deg. F, service limit. Minimum 2 hour fire rating required.

2.12 CABINET & CEILING EXHAUST FANS

A. See plans for Manufacturers, Models & Performance to equal.

B. Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing lined with 112 inch acoustic insulation, resilient mounted motor, gravity back draft damper in discharge.

C. See plans for Electrical Characteristics & Components. Disconnect Switch via cord & plug in housing for thermal overload protected motor & wall mounted switch, timer, multiple speed switch, or solid state speed controller as noted.

D. Grille: Molded white plastic or aluminum with baked white enamel finish.

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.

3.3 FIRE PROOFING INSULATION INSTALLATION

A. Install in accordance with manufacturer's instructions,

B. Install two (2) layer wrap with 3" perimeter & longitudinal overlap on both layers. Filament tape is to used only as a temporary hold until banding is in place on the exterior wrap. For duct spans of greater than 24", insulation pins are required on the bottom of horizontal & on vertical duct runs to prevent sags. Install carbon steel or stainless steel banding around exterior wrap.

C. Install fire proofing insulation on all of exhaust duct from range hood (make-up air does not require fire proof wrap, just standard 2" duct insulations).

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

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,

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.

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 For:
    1. Telephone Systems & Service
    2. Cable TV

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: IVORY TOGGLE

1. AC general use, quiet-operating snap switch rated 20 amperes and 120-277 volts AC, with plastic toggle handle, ivory color.

B. Receptacle: IVORY STANDARD

1. Provide straight blade receptacles to NEMA WD 1.

a. Convenience Receptacle Configuration: Type 5-20 R, plastic face, ivory color

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.
2. Elevators: Determine location of outlets for lights, cab circuits, machines, and equipment inside(' in elevator pit, shaft, and machine rooms with elevator installer 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.

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.

1.3 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. Operation and Maintenance Instructions: Include instructions on fire alarm and smoke detection system.
D. 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. The catalog numbers specified under this section are those of Simplex Time Recorder Co. and constitute the type, product quality, material and desired operating features.
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.

END OF SECTION