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TITLE SHEET

Owner
City of Alamosa
300 Hunt Ave
Alamosa, CO 81101
719.589.6631

Architect
Ron McClure Architect LLC
P.O. Box 83
Del Norte, Colorado 81132
719.657.3221 phone

Contractor
Yet to be determined

INDEX TO DRAWINGS

Section 00100 INSTRUCTION TO BIDDERS

1. General Instructions

A. Before submitting a proposal each bidder shall examine these instructions, the specifications contained herein and all pertinent drawings, and should visit the site of the proposed work in order to become fully informed concerning all existing conditions and limitations which may affect execution of the work.

B. Should any omissions or ambiguities in the drawings or specifications be discovered during the examination of the contract documents or upon visiting the job site, they should be brought to the attention of the Architect or his authorized representative not later than ten (10) calendar days before bid opening date. All inquires will be promptly reviewed and where necessary a clarifying written addendum will be issued and made a part of the contract documents.

C. The bidders shall familiarize themselves with the provisions of the laws, codes and regulations of the State of Colorado, local agencies, and municipalities that have jurisdiction at the location of the work. Contractor shall comply with, and require all subcontractors to comply with, State and City Contractor's License Law.

2. Proposals

In order to be eligible for consideration, all proposals must adhere to the following provisions.

A. Bid proposals shall be submitted on the Form of Proposal provided herewith or an accurate copy thereof. All blanks shall be complete and numbers shall be stated both in writing and in figures. Avoid all erasures, changes or additions on the Form of Proposal since these deviations may result in the Owner's rejection of the bid as not being responsive to the invitation.

The bid documents shall include all of the following forms:

1. Bid
2. Bid Bond
3. Non-Collusive Affidavit
4. List of Sub-Contractors (Separate Envelope)

B. The signatures must be in longhand and executed by a principal duly authorized to make contracts. The bidder's legal name must be fully stated.

C. No bidder may withdraw a bid within 30 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the Owner and the Bidder.

D. Proposals must be accompanied by a bid bond for not less than five percent (5%) of the total amount of the bid, or a certified check or bank draft, made payable to the order of City of Alamosa, said bid bond to serve as a guarantee of the intent of the Bidder to enter into a contract to perform all matters included in the said proposal in accordance with the plans and specifications, and on the date, and in the time specified, or as liquidated damages in event of failure or refusal of the Bidder to enter into such contract. Said bid will be returned to the Bidders whose proposals are not accepted, and to the successful Contractor upon the execution of a satisfactory Performance Bond and Contract.

E. Successful bidder will be required to submit a list of sub-contractors and major material suppliers to the Owner.

F. Any Bidder may withdraw his bid, either personally, by written request, or by telephone request, confirmed in writing, at any time prior to the scheduled closing time for receipt of bids.

G. All proposals shall be submitted on the Form of Proposal and delivered in sealed envelopes bearing on the outside the name of the Bidder, his address and the name of the project for which the bid is submitted. Each bid shall be filed with the City of Alamosa, on or before date and time specified. It is the sole responsibility of the Bidder to deliver his bid in proper time. Any proposal received after the scheduled closing time previously stated will be returned to the Bidder unopened. All bids to be either hand delivered or delivered by overnight mail by the given time and date. <u>No electronic fillings of bids will be accepted</u>.

H. The Owner reserves the right to reject any or all bids and proposals, to accept any proposals or alternate proposal and to waive any informality in bids received in considering the relative merits of the proposals. The award of the Contract, if made, will be to the lowest qualified Bidder.

I. Protest Procedure: Bid protests shall be submitted in writing to the Owner.

Protests must contain at a minimum the name, address and telephone number of the protestor, the signature of the protestor or its representative and evidence of authority to sign; a detailed statement of the legal and factual grounds of the protest including copies of relevant data; and the form of relief requested. Within three (3) business days of receipt, and after consultation with Legal Counsel, and others, the Owner will respond to the protest. The Owner reserves the right to reject any or all bids; to waive irregularities or information in any bid; to re-advertise bid; and/or take any steps determined prudent, in order to resolve the protest.

J. Prior to the awarding of this Contract, the Owner may defer its decision for a period not to exceed thirty (30) days from the date of opening of Bids for the purpose of reviewing the Bids and investigating the qualifications of Bidders, prior to awarding of the Contract.

BID FORMS

Parks Office Building

Proposal of _____
(Hereinafter called "Bidder") organized and existing under the laws of the State of _____ doing business as _____. *

TO: City of Alamosa

GENTLEMEN:

The Bidder, in compliance with your invitation for bids for Alamosa Parks Office Building, having examined the specifications with related documents, and the site of the proposed work, and being familiar with all of the conditions surrounding the proposed project, including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within _____ consecutive calendar days thereafter as stipulated in the specifications.

Bidder acknowledges receipt of the following addendum:

Addendum No. _____ dated _____

Addendum No. _____ dated _____

*Insert "a corporation", "a partnership", or "an individual"
as applicable.

Base Proposal: The Bidder agrees to perform all of the work described in the specifications and shown on the plans for the total sum of

_____

($_____), (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

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

Upon receipt of written notice of the acceptance of this bid, the bidder will execute the formal contract attached within ten (10) days and deliver a Surety Bond or Bonds as required by the Contract Documents.

($_____) is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted,

By: _____
(Title)

(SEAL – if bid is by a corporation)

_____
Business Address

_____
Contractor's License Number

BID ALTERNATE

LIST OF SUBCONTRACTORS

Parks Office Building

Note: This form is to be completed and submitted by the successful Bidder in a properly identified, sealed envelope. If additional space is needed, the other side of this sheet may be utilized.

Project: In compliance with the Instructions to Bidders, the undersigned submits the following names of **all** subcontractors to be used in performing the Contract.

If not subcontractors are to be used in this contract, enter "none" below.

Subcontractor's Name	Subcontractor's Work

_____

Contractor's Authorized Signature

Section 00500 CONTRACT FORMS

Form of Agreement

The Contractor-Sub-Contractor Standard Form of Agreement, A.I.A. Document No. A-401, 2007 Edition will be used as Form of Agreement.

Performance Bond

A.I.A. Document A-312, February 1984 Edition, shall be used as the form of Performance Bond on this project or form in Specification.

Labor and Material Payment Bond

A.I.A. Document A-312, February 1984 Edition, shall be used as form of Labor and Material Payment Bond on this project of form in Specification.

Application and Certificate for Payment

A.I.A. Document G-702, May 1992 Edition, shall be used as the form for Pay Requests on this project.

End of Section 00500

Section 00650 SPECIAL INSTRUCTIONS

PARKS AND CEMETERY OFFICE

Section 1 PROJECT SITE:

The site is located at 20th and State, Alamosa, CO 81101

Section 2 TIME FOR COMPLETION:

The Contractor will be given **180 calendar days**, from the order to commence construction at the time stipulated in the Notice to Proceed to the Contractor, to complete the project, and to obtain final completion and approval from the Construction Manager. If there are delays according to the weather, the Contractor is to notify the Construction Manager and include with each pay request a summary and notation of construction days lost during that pay period. The Construction Manager or Architect will then, if needed and warranted, add to the length of construction. The Owner is concerned about the final permanence and quality of the building, as well as, desiring to support a well programmed and controlled construction process.

Section 4 SPECIAL INSTRUCTIONS FOR BIDDING:

Before submitting a proposal each bidder shall examine these instructions, the specifications contained herein and all pertinent Drawings, and should visit the site of the proposed work in order to become fully informed concerning all existing conditions and limitations which may affect execution of the work.

Section 00700 GENERAL CONDITIONS OF THE CONTRACT

General Conditions

AIA A201/2007 Ed.

This form of the General Conditions of the Contract will be used as if bound within these Specifications and form an integral part of the Contract Documents.

Section 00800 SUPPLEMENTATY CONDITIONS OF THE CONTRACT

1. Definitions

A. The "Contract" is set forth in the Proposal Form and Contract Form and includes as part of the specifications the Invitation to Bidders, Instructions to Bidders, General Contract Conditions, Federal Provisions, Special Provisions, and Technical Provisions plus the Contract Drawings.

B. The "Work" of the Contractor shall consist of furnishing all labor, materials, equipment, tools, contractor's equipment, supplies, transportation, superintendents' services, etc., necessary for the completion of the work shown, indicated or noted on drawings and/or on the specifications.

C. The word "Owner" as used in these specifications, project drawings, or in the Contract, refers to the person or entity identified as such in the Owner-Contractor Agreement.

D. "Contractor" as used in these specifications or in the Contract means the person, firm, or corporation with whom the Owner has entered into contract with to provide said services.

E. The authorized representative of the Owner shall be Pat Steenburg and Harry Reynolds, City of Alamosa and Ron McClure Architect.

2. Execution, Correlation and Intent of Documents

A. The drawings and specifications are complementary and any work called for on the drawings and not mentioned in the specifications or vice-versa, shall be performed as though fully set forth in both. In case of differences or conflicts between the specifications and drawings, the specifications will govern; figured dimensions shall take precedence over general drawings. Detail representations having the larger scale shall govern. The Contractor shall be responsible for certifying all grades, lines, levels and dimensions indicated on drawings and shall promptly report any inconsistencies before preparing shop drawings or before any work is fabricated or constructed.

B. In case of any discrepancy either in the drawings or in the specifications, the matter shall be promptly brought to the attention of the authorized representative, who shall promptly make a determination in writing. Any adjustment by the Contractor without prior approval by the authorized representative shall be at his own risk and expense. The Contractor shall check and coordinate the work sufficiently in advance to minimize any delays that may result from a need to implement corrective action for an error or omission in the contract documents.

3. Permits and Responsibilities

The Contractor shall, without additional expense to the Owner, be responsible for obtaining any necessary licenses and permits and for complying with any applicable Federal, State and Municipal Laws, codes and regulations in connection with the execution of the work.

4. Protection of Work, People and Property

A. The Contractor shall continuously maintain adequate protection of all work from damage and shall protect the Owner's property from injury or loss arising in connection with this Contract. He shall make good any such damage, injury or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner, or due to causes beyond the Contractor's control and not to his fault or negligence. He shall adequately protect adjacent property as provided by law and the Contract Documents.

B. The Contractor shall take all necessary precautions for the safety of employees on the work site, and shall comply with all applicable provisions of Federal, State and Municipal safety laws and Engineering or Traffic codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed.

C. The Contractor shall construct and maintain substantial fences and/or barricades around all open excavations and around walks and driveways during the time of construction, not only on public property, but also on the building site. The Contractor shall also provide warning lights and take other safety precautions as required by ordinances and safety regulations or commonly accepted safety practices, or as required by the Owner.

D. The Contractor shall notify the State Historic Preservation Officer and/or the State Archaeologist if cultural resources are discovered during construction.

5. Utilities for Construction

The Contractor shall make all arrangements for and shall provide and pay for the main supply of all temporary utility services as needed in the prosecution of the work.

6. Supervision of the Work

The Contractor shall keep on this project a competent Superintendent and any necessary assistants, all satisfactory to the Owner. The superintendent shall represent the Contractor in his absence and all directions given by him shall be binding as if given by the Contractor.

7. Workmanship

Where not more specifically described in any of the various Sections of these Specifications, workmanship shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction or installation regularly furnished or required for completion.

All work shall be executed by skilled journeymen, laborers or mechanics thoroughly trained in their respective lines of work.

When completed, all parts shall have been durable and substantially built and shall present a neat, workmanlike appearance.

8. Shop Drawings and Equipment Brochure

Detailed dimensioned shop drawings and/or equipment brochures and catalog cuts shall be submitted on all equipment as required by other sections of this Specification. The Contractor shall submit five bound copies of each shop drawings to the authorized representative for approval. These items submitted for approval will be promptly reviewed, three copies of each submittal item retained and the remainder returned to the Contractor. No equipment should be ordered until these shop drawings or brochures have been approved by the Owner's representative.

9. Site Investigation and Representations

Contractor acknowledges satisfaction as to the nature and location of the work, the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, the conformation and condition of the ground, the character and quality and quantity of surface and subsurface materials to be encountered, the character of equipment and facilities needed preliminary to and during the progression of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with all the available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any understanding or representation made by any of its officers or agents during or prior to the negotiation and execution of this contract, unless (1) such understanding or representations are expressly stated in the Contract; and (2) the Contract expressly provides that responsibility therefore is assumed by the Owner.

10. Contractor's Responsibility

The Contractor assumes full responsibility for the safekeeping of all materials and equipment and for the protection of all unfinished work until final acceptance by the Owner, and if any of it be damaged or be destroyed from any cause, he shall replace it at his own expense. The Contractor must indemnify and save harmless the Owner against any claims filed for non-payment of his bills in connection with the Contract work.

11. Use of Premises

A. The Contractor shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the authorized representative and shall not unreasonably encumber the premises with his materials.

B. Any damages caused to lawns, shrubs, windows, buildings, etc., shall be immediately repaired or replaced at no expense to the Owner. The Contractor shall be responsible for the proper care and protection of all his materials, equipment, etc. They may be stored on the premises but placing of same shall be subject to the approval of the authorized representative.

C. Access to site and designation of parking areas for Contractor vehicles shall be in accordance with directives of the authorized representative.

12. Other Contracts

The Owner may undertake or award other contracts for additional work at the job site simultaneously with the work under this contract. The Contractor shall fully cooperate with such other Contractors or Owner's employees and shall fit his own work to such additional work as may be directed by the Owner. The Contractor shall not commit or permit any act which will interfere with the performance of work of any other Contractor or Owner's employees.

13. Contractor's Insurance

The Contractor shall provide and maintain, and cause its subcontractors to provide and maintain, the following minimum requirements:

A. Compensation Insurance – Worker's Compensation Insurance for all of his employees employed at the site of the project and in case any work is sublet, the **Contractor** shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees to be engaged at the site of the project unless such employees are covered by the protection afforded by the Contractor's Workers Compensation Insurance. In case any class of employees engaged in hazardous work under this contract at the site of the project is not

protected under the Worker's Compensation Statute, the **Contractor** shall provide, and shall cause each subcontractor to provide, protection equal to that required by law for the protection of his employees not otherwise protected.

B. General Liability Insurance – With a minimum combined single limit of **$1,000,000** each occurrence. The policy shall include coverage for bodily injury and personal injury, broad form property damage, blanket contractual, contractor's protective, products/completed operations, explosions and collapse, and underground hazards.

C. Comprehensive Auto Liability Insurance – With a combined single limit for bodily injury and property damage of no less than **$1,000,000** each occurrence, with respect to **Contractor's** vehicles (whether owned, hired, non-owned), assigned to our utilized in the performance of this Contract.

D. Builder's Risk Insurance – The Contractor will maintain Builder's Risk Insurance (Fire and Extended Coverage) on a 100% completed value basis on the insurable portions of the Project for the benefit of the Owner, the Contractor, and all subcontractors, as their interest may appear.

E. The insurance/policies provided by the **Contractor** shall name the Owner as an additional insured in respect to liability arising in any manner out of the performance of any contract entered into between the named insured and the Owner or liability arising out of any services provided or duty performed by any party as required by statute, law, purchase order or otherwise required. The insurance policies shall specify that insurance afforded the **Contractor** shall be primary insurance, and that any insurance coverage carried by the Owner or its employees shall be excess coverage, and not contributory coverage to that provided by the **Contractor.**

F. The **Contractor** shall furnish the Owner with a Certificate of Insurance as required by this section prior to issuance of a Notice to Proceed.

14. Sales and Use Tax

The Contractor is not to add any sales tax to his bid.

15. Changes in Work

A. The Owner may, from time to time, by written instructions or drawings issued to the Contractor, make changes in the drawings and specifications, issue additional instructions, require additional work, or direct the omission of work previously ordered, and the provisions of the Contract shall apply to all such changes, modifications and additions with the same effect as if they were embodies in the original drawings and specifications.

B. If such changes are likely to cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contact, the Owner will execute a formal Change Order based on detailed quotations received from the Contractor for the work related to the change. Change Orders affecting contract amount or time are subject to approval by the Owner.

16. Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the work in accordance with the Contract Documents or fails to perform any provision of the Contract, the Owner may, after seven days written notice to the Contractor and without prejudice to any other remedy he may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

17. Time For Completion and Liquidation Damages (Refer to Special Instructions)

A. It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning, rate of progress, and the time for completion of work to be done hereunder, are Essential Conditions of this Contract, and it is further mutually understood and agreed that the work embraced in the Contract shall be commenced of the date of "Notice to Proceed." The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will ensure full completion thereof within the time stated in the Proposal. He also shall consider that the Owner needs the complete use of the facilities as quickly as possible.

18. Removal of Rubbish and Final Clean-Up

The Contractor shall, at all times, keep the premises free from accumulation of waste materials or rubbish caused by his employees or work. Upon completion of the work under his contract, the Contractor shall remove all temporary structures, superfluous and waste materials of whatever kind both within buildings and around the site generally.

The Contractor shall leave buildings in a the removal of all stains, paint spots, and accumulated debris, dirt or dust caused by both his operation and those of his subcontractors.

19. Payments

A. Payment shall be made by the Owner to the Contractor on the basis of bi-weekly invoices which must include a detailed itemization of all work and materials included, copies of receipts or billings as requested, subject to review of the Owner's authorized representative prior to payment. Payments will be processed on percentage of work completed and materials in storage with invoices. Pay applications shall be submitted on AIA Document G-702 to the Owner's Representative.

The City of Alamosa pays at 2-week intervals. Approved pay applications submitted by a specified Friday will be paid two weeks later on Friday.

B. During the course of construction, the Owner shall require unconditional waiver and release pursuant to Colorado Statute from sub-contractors for all completed work with the General Contractor's at the submission of request for progress payments and all waivers from sub-contractors prior to payment of retention monies.

20. Guarantee-Warranty

A. The Contractor shall, and hereby does, warrant and guarantee that all work performed under this contract will be free from defects of materials and workmanship for a period of twelve (12) months from the date of final acceptance of this work.

B. Contractor agrees that he will, at his own expense, repair and replace all such defective work which is found to be defective during the term of this warranty. Should Contractor fail to repair or replace such defective material and/or workmanship within thirty (30) days after written notice from Owner, the Owner may perform the necessary work; and Contractor hereby agrees to reimburse the Owner for actual cost.

C. The warranty period on any part of the work so repaired or replaced shall be extended for a period of twelve (12) months from the date of such repair or replacement.

21. Final Inspection, Acceptance and Payment

A. The Contractor shall call for a final inspection of the work only after he has determined that all items or work have been completed in accordance with the contract plans and specifications.

B. When the project work is deemed substantially complete and suitable for occupancy and/or use by the Owner, a Certificate of Substantial Completion will be issued establishing the warranty period start date.

C. Applications for final payment will not be accepted and processed until the Owner's authorized representative is satisfied that the work is satisfactorily completed, including "punch list" items; and that all manuals, documents guarantees and "as built" drawings have been received.

D. The Contractor, when applying for partial payment of the Contract amount, shall submit a schedule of values of the various parts of the work and clearly indicate the percentage completion of the various parts, all in substantiation to the total payment for which application is being made.

22. Construction Sign

A. This contract does not require a construction sign, the chosen contractor is, however, welcome to erect a sign for thier own purposes.

B. The sign art is to be by skilled painters and applied over a background base paint coats and shall bear the name of the project, the Owner, Architect's name, Owner Representative's name, and the Contractor's name.

C. Construct sign 48 x 72 inches, ¾ inch thick exterior plywood framed with 2 x 4 at top and bottom and 4 x 4 at sides extending as posts into ground, with bottom of sign 48 inches above ground. The Contractor shall maintain and keep sign in good appearance throughout the duration of the project.

23. Utility Cost

The Contractor shall pay cost of water, sewer, power and gas. Temporary connections shall be the Contractor's responsibility and he shall pay all costs connected thereto, until occupancy of the building by the Owner.

24. Quality of Work and Weather Conditions

A. The Owner wants a high quality of construction and wants to take precautions during construction that will insure that the final product will reflect the good intentions of the building committee, as agents of the authority. These precautions could include suspension of work during extremely adverse weather conditions. The Contractor shall take extreme care in the protection of the building in progress and the protection of materials stored on site during the construction process until final completion and acceptance of building by the Construction Manager.

25. Schedule of Work

A. Contractor shall submit a Schedule of Values (SOV) for the Owner, or Owner's Representative, for prospective phasing of work trades during the Construction period.

26. Licenses

A. Contractor to secure a City Business License to practice within the City of Alamosa, Colorado. License must be procured before commencing work.

27. IECC

This Project will comply with the IECC (International Energy Conservation Code) 2009. Every effort has been made during the preparation of the Contract Documents to preserve and implement this intent.

28. Piping and Fittings

A. Pex piping and fittings Vanguard SOR-9, 100 psi @ 180 degrees F/160 psi @ 73 degrees F, ASTM F876, F877, F1807/F2159. Hot and cold tubing is an acceptable substitution for the plumbing specification for piping in the Project.

End of Section 00800

DIVISION ONE – GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF THE WORK

PART ONE – GENERAL

1.1 DESCRIPTION

A. Description of Work: Provide all labor, materials, fabrication equipment, appurtenances, transportation and services required, necessary for and incidental to the completion of work indicated by the Contract Documents entitled:

Parks and Cemetery Office

20th and State, Alamosa, CO. Refer to location map and Site Plan

PART TWO – PRODUCTS

2.1. Specifications

A. In the preparation of these Specifications an effort has been made to segregate the various branches of the work under headings, by trades. This is done only for convenience and shall not relieve the Contractor of the responsibility of furnishing every item indicated or specified whether properly segregated or not.

B. Specification arrangement is in accordance with the "Construction Specification Institute" (CSI). The 5 digit Arabic Section designation is in accordance with above referenced document.

C. No responsibility will be assumed by the Architect for omissions of duplications by the Contractor in the completion of the Contract due to any alleged error in the arrangement of the material in these Specifications nor shall any such segregation or work and materials operate to make the Architect an arbiter in defining limits to the agreements between the Contractor and his subcontractors or suppliers.

D. The misplacement, addition or omission of any letter, word or punctuation mark shall in no way damage the true spirit, intent, or meaning of these Specifications.

E. The words "shown", "indicated", "noted", "scheduled", or words of like effect shall be understood to mean that reference is made to the Drawings accompanying these Specifications.

2.2 Approved Applicators and Installers

A. Where specific instructions in the specifications require that a particular product or material be applied or installed by an "approved applicator or installer" it shall be the Contractor's responsibility to insure that any subcontractor or sub-subcontractor used for such work is currently certified by the particular manufacturer for this type of installation.

2.3 Watertight – Weather tight

A. Anything in the Contract Documents notwithstanding, the Contractor accepts the responsibility of constructing a watertight, weather tight Project.

End Section 01010

SECTION 01085

APPLICABLE STANDARDS

PART ONE – GENERAL

1.1 Description

Work Included:

A. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

B. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.

C. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

D. Related work described elsewhere: Specific naming of codes or standards occurs on the Drawings and other Sections of these Specifications.

1.2 Quality Assurance

A. Familiarity with pertinent codes and standards: In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in the Work meet or exceed the specified requirements.

B. Applicable Standards listed in these specifications include but are not necessarily limited to, standards promulgated by the following agencies and organizations:

(1) AASHTO American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, DC 20004

(2)	ACI	American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48129
(3)	AISC	American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, New York 10020
(4)	ANSI	American National Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, New York 10018
(5)	ASTM	American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103
(6)	AWS	American Welding Society, Inc., 2501 N.W. 7th Street, Miami, Florida 33125
(7)	AWWA	American Water Works Association, Inc., 666 West Quincy Avenue, Denver, Colorado 82035
(8)	CRSI	Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610
(9)	CS	Commercial Standard of NBS, U.S. Department of Commerce, Government Printing Office, Washington, DC 20402
(10)	FGMA	Flat Glass Marketing Association, 3310 Harrison, Topeka, Kansas 66611
(11)	NAAMM	National Association of Architectural Metal Manufacturers, 1033 South Blvd., Oak Park, Illinois 60302
(12)	NEC	National Electrical Code (see NFPA)
(13)	NEMA	National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017
(14)	NFPA	National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210
(15)	SDI	Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125
(16)	SSPC	Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, Pennsylvania 15213

(17) TCA Tile Council of America, Inc., PO Box 326, Princeton, New Jersey 08540

(18) UL Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611

(19) IBC International Building Code 2009 Edition, International Code Council, Inc., 509 New Jersey Avenue, Washington, D.C. 20001

(20) IECC International Energy Conservation Code 2009 Edition.

End of Section 01085

SECTION 01300

SUBMITTALS AND SUBSTITUTIONS

PART ONE – GENERAL

1.1 Description

A. Work Included: Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance.

B. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for their review by the Architect.

C. Make all submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

D. Related work described elsewhere: Individual requirements for submittals are described in pertinent other Sections of these Specifications.

1.2 Quality Assurance

A. Coordination of submittals: Prior to each submittal, the General Contractor shall carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittals for it conforms in all respects with the requirements of the Contract Documents by affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

B. If the shop drawings or manufacturers' data show variations from the Contract requirements because of standard shop practice or other reason, the Contractor shall make specific mention of such variations in his letter of transmittal, in order that, if acceptable, suitable action may be taken for proper adjustment of the contract; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract, even though the submittals have been approved.

1.3 Submittals

A. Submittal schedule: Immediately following the award of the contract, and before any items are submitted for approval, submit to the Architect two copies of the schedule described in Article 2.1 of this Section.

B. Procedures: Make submittals in strict accordance with the provisions of this Section.

PART TWO – PRODUCTS

2.1 Submittal Schedule

A. General: Compile a complete and comprehensive schedule of all submittals anticipated to be made during progress of the Work. Include a list of each type and item for which Contractor's drawings, Shop Drawings, Certificates of Compliance, material samples, guarantees, or other types of submittals are required. Upon approval by the Architect this schedule will become part of the Contract and the Contractor will be required to adhere to the schedule except when specifically otherwise permitted.

B. Coordination: Coordinate the schedule with all necessary subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere. Coordinate as required to ensure the grouping of SUBMITTALS as described in Paragraph 3.2 below.

C. Revisions: Revise and update the schedule on a monthly basis as necessary to reflect conditions and sequences. Promptly submit revised schedules to the Architect for review and comment.

2.2 Shop Drawings and Coordination Drawings

A. Scale and measurements: Make all Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.

B. Type of prints required: Submit all Shop Drawings in the form of one sepia transparency of each sheet plus one blue line or black line print of each sheet and such other copies as may be required.

C. Reproduction of review Shop Drawings: Printing and distribution of review Shop Drawings for the Architect's use will be by the Architect. All review comments of the Architect will be shown on the sepia transparency when it is returned to the Contractor. The Contractor shall make and distribute all copies required for his purposes.

2.3 Manufacturer's Literature

A. General: Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review.

B. Number of copies required: Submit the number of copies which are required to be returned plus two copies which will be retained by the Architect.

2.4 Samples

A. Accuracy of samples: Samples shall be of the precise article proposed to be furnished.

B. Number of samples required: Unless otherwise specified, submit all Samples in the quantity which is required to be returned plus one which will be retained by the Architect.

C. Reuse of the samples: In situations specifically so approved by the Architect, the Architect's retained sample may be used in the construction as one of the installed items.

2.5 Colors and Patterns

A. Unless the precise color and pattern is specifically described in the Contract Documents, and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the Architect for review and selection.

2.6 Substitutions

A. When a specific manufacturer, trade name or material is specified, or indicated, it is to establish a standard of quality and shall not be construed as limiting competition. If the Contractor desires to use material other than that specified, he shall request approval of such substitution, in writing, to the Architect.

B. Request for substitutions shall be in the hands of the Architect no later than 12 days prior to the stated date of bidding as identified in the Contract Documents. Materials found acceptable for bidding will be approved by a duly authorized Addendum issued by the Architect.

C. Submittals for approval of substitute materials shall contain sufficient information, descriptive brochures, drawings, samples or other data as is necessary to provide direct comparison to the specified materials. Each submittal shall be well marked and identified as to type and kind of items being submitted for approval.

D. It is the sole responsibility of the Bidder to submit complete descriptive and technical information so that the Architect can make proper appraisal. Lack of proper information will be sufficient cause for rejection. Referenced to catalogs that the Architect may or may not have will not be acceptable.

E. Award of the contract in accordance with Contract Documents requires that the specified materials and equipment shall be furnished and installed.

F. Unless specifically submitted and approved in accordance with above, substitutions will not be allowed.

G. "Approved substitute", "Or equal": Where the phrases, "approved substitute", "or equal", or "approved substitute as approved by the Architect", "or equal as approved by the Architect" occurs in the Contract Documents, do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this Work by the Architect.

H. The decision of the Architect shall be final.

PART THREE – EXECUTION

3.1 Identification of Submittals

A. General: Consecutively number all Submittals. Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals.

B. Internal identification: On at least the first of each copy of each submittal, and elsewhere as required for positive identification, clearly indicate the submittal number in which the item was included.

C. Re-submittals: When material is re-submitted for any reason, transmit under a new letter of transmittal and with a new submittal number.

D. Submittal log: Maintain an accurate submittal log for the duration of the contract, showing current status of all submittals at all times. Make the submittal log available for the Architect's review upon request.

3.2 Coordination of Submittals

A. General: Prior to submittal for approval, use all means necessary to fully coordinate all material including, but not necessarily limited to:

(1) Determine and verify all interface conditions, catalog numbers, and similar data.

(2) Coordinate with other trades as required.

(3) Clearly indicate all deviations from requirements of the Contract Documents.

B. Grouping of submittals: Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.

3.3 Timing of Submittals

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

B. Architect's review time: In scheduling, allow at least 10 calendar days for review by the Architect following his receipt of the submittal.

C. Delays: Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the Contract completion date.

3.4 Architect's Review

A. General: Review by the Architect shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the Contractor from responsibility for errors which may exist.

B. Authority to proceed: The notations "Reviewed" or "Reviewed As Noted", authorize the Contractor to proceed with fabrication, purchase, or both, of the items so noted, subject to the revisions, if any, required by the Architect's review comments.

C. Revisions: Make all revisions required by the Architect. If the Contractor considers any required revision to be a change, he shall so notify the Architect as provided for under "Changes" in the General Conditions. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed or approved by the Architect.

D. Revisions after approval: When a submittal has been reviewed by the Architect, re-submittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

End of Section 01300

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART ONE – GENERAL

1.1 Description

A. Work Included: Temporary facilities and controls required for this Work includes, but are not necessarily limited to:

(1) Temporary utilities such as water, electricity shall be furnished by the City of Alamosa on site.

(2) Sanitary facilities

(3) Enclosures such as tarpaulins, barricades and canopies

(4) Fencing of the construction area

(5) Haul roads

B. Related work described elsewhere:

(1) Except that all equipment furnished by subcontractors shall comply with all requirements of pertinent safety regulations, the ladders, planks, hoists and similar items normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.

(2) Permanent installation and hook-up of the various utility lines are described in the pertinent other Sections of these Specifications.

1.2 Product Handling

A. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

1.3 Job Conditions

A. Make all required connections to existing utility systems with minimum disruption to services in the existing utility systems. When disruption of the existing service is required, do not proceed without the Architect's approval and, when required, provide alternate temporary service.

PART TWO – PRODUCTS:

2.1 Utilities

A. General: All temporary facilities shall be subject to the Architect's approval.

B. Water: Temporary water will be provided by the Contractor. Permanent water will be provided by the Owner.

C. Electricity: Temporary electricity will be provided by the Contractor. Permanent electricity will be provided by the Owner.

D. Telephone: Contractor shall furnish phone services for job site use; mobile or cellular.

E. Sanitary facilities: Provide temporary facilities in the quantity required for use of all personnel. Maintain in a sanitary condition at all times.

2.2 Enclosures

A. Furnish, install, and maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, and other temporary construction necessary for proper completion of the Work in compliance with all safety and other regulations. All enclosures must be placed so as not to impede daily clientele and staff use of the existing building.

PART THREE – EXECUTION

3.1 Maintenance and removal

A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls ad rapidly as progress of the Work will permit, or as directed by the Architect.

End of Section 01500

SECTION 01700

PROJECT CLOSEOUT

PART ONE – GENERAL

1.1 Description

A. Work Included: All requirements and procedures for submittal of pertinent data relating to closing out the Project upon completion of the project work. Detailed instructions elsewhere in these Specifications may require that certain items listed herein be submitted prior to Substantial Completion of the Project. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions.

1.2 Final Payment

A. Receipt and approval of all items specified in this Section is a prerequisite for final payment.

1.3 Lien Waivers

A. Final material and Labor Lien Waivers are required. There are to be no conditional lien waivers. All supplier lien waivers shall reflect specific project including site address.

1.4 Record Drawings

A. Contractor shall provide Record Drawings which shall clearly show all differences between the Contract work as drawn and as installed for all work, as well as work added to the Contract which is not shown on the Contract Drawings.

B. Contractor shall maintain a set of Record Drawings at the job site. These shall be kept legible and current and shall be available for inspection at all times by the Architect. Show all changes in the Contract work, or work added, on these Record Drawings in a contrasting color, including work changed by Addendum or Bulletin.

C. Prepare separate sets of Record Drawings for the architectural, heating, air conditioning, plumbing and electrical work.

In showing changes in the work, or added work, use the same legends as were used on the Contract Drawings. Indicate exact locations by dimensions and exact elevation given in job datum, by depth.

D. Give dimensions from a permanent point. Give elevations to sewer and storm drainage lines to the invert elevation.

E. Mechanical and electrical Record Drawings shall indicate exact routing of all piping, duct work, power and control wiring, etc., location and function of all controls and whether manual or automatic and normal amperage readings for all motors taken at the equipment under normal conditions.

F. Record Drawings shall contain the names, addresses and phone number of the Subcontractors and shall be signed by the Contractor.

G. Architect shall approve the Record Drawings and he shall be the sole judge of the Acceptability of these drawings.

H. Upon Substantial Completion of the Project work, submit Record Drawings to the Architect for approval. Upon receipt of notice of approval of the Record Drawings, deliver them, together with one set of prints, to the Architect.

1.5 Maintenance Manual and Operating Instructions

A. Upon completion of the installation of all work specified under Division 14, furnish 3 complete bound copies of operating and maintenance instruction and parts lists of all materials and equipment, including electrical and control items, being supplied.

B. Operating instructions shall include complete operating sequence, control diagrams, description of method of operation machinery, machine serial numbers, factory order numbers, parts lists, instruction booklets suppliers phone numbers and addresses and individual equipment guarantee. Parts list shall be complete in every respect, showing all parts and part numbers for ready reference.

C. Assemble maintenance manual and operating instructions in hard back 3-ring loose leaf binders. Suitably label and index all material contained therein for ready reference.

D. Upon substantial completion of the project work, submit one copy of the maintenance manual and operating instruction to the Architect for approval. Upon receipt of notice of approval deliver the additional copies to the Architect.

1.6 Guarantees

A. Submit all required guarantees to the Architect. In addition, provide all written guarantees or certificates required as specified in these Specifications.

B. The following list is intended as a guide to the Contractor to aid in his submittal of required data; however, this list is not necessarily to be construed as being complete:

Division 14 - Equipment Warranties

1.7 Spare Parts and Maintenance Materials

A. The Contractor shall deliver to the Owner the spare parts, extra stock and maintenance materials listed below, and shall obtain a signed receipt for these materials. Materials shall be neatly packaged and identified.

SECTION	**ITEM**
09651 – Resilient Floor Tile	One box of each color tile used
09680 – Carpet	Extra 4 yards of each color used

1.8 Semi-final and Final Inspections

A. When Contractor is of the opinion that the Project is substantially complete, he shall send to the Architect a written statement that the Project is substantially complete (naming a date) and shall request a semi-final inspection by the Architect and Owners Representative to determine the status of completion. Such notice shall be given at least 3 days before the requested inspection date.

B. If the Architect finds that the Project is substantially complete, he will prepare a Certificate of Substantial Completion, AIA Document G-704, for the approval and acceptance of the Contractor and the Owner, attaching thereto a list or "Punch List" of items to be completed or corrected.

C. If the Architect does not concur in the Contractor's claim of substantial completion, he will so notify the Contractor and thereafter the Contractor shall initiate a new request for (semi-final) inspection.

D. As the Contractor completes the "Punch List" of uncompleted or uncorrected items, he shall submit to the Architect for his review:

All required Operating Instructions
Manuals, Guarantees and Certificates
Record Drawings

E. When all items on the "Punch List" are completed or corrected, the Contractor shall send to the Architect a statement that the Project is complete and request a final inspection.

F. If the Project is complete and all "Punch List" items are completed or corrected, the Architect will issue a final "Certificate of Payment".

G. After completion of the procedures outlined above, the Contractor shall submit his final application for payment in accordance with the Agreement, the General Conditions and Supplementary General Conditions.

1.9 Final Checkout of Structure and Equipment with Owner

A. Before acceptance and final payment, at a time arrived at with the Owner, a complete checkout and test shall be made of all mechanical and electrical systems, architectural and structural devices, etc., with the Owner. For this purpose, each trade concerned shall provide a skilled operating engineer or technician for a period of at least one day. This person, together with selected operating personnel, shall test all systems and devices and demonstrate the complete operation and required maintenance of each.

End of Section 01700

SECTION 01710

CLEANING

PART ONE – GENERAL

1.1 Description

A. Work Included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. Related work described elsewhere: In addition to standards described in this Section, comply with all requirements for cleaning up as described in various other Sections of these Specifications.

1.2 Quality Assurance

A. Inspection: Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.

B. Codes and standards: In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART TWO – PRODUCTS

2.1 Cleaning Materials and Equipment

A. Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 Compatibility

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Architect.

PART THREE – EXECUTION

3.1 General:

A. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic and providing the required protection of materials.

B. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this work.

C. At least twice each month and more often if necessary, completely remove all scrap, debris, and waste material from the job.

D. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.

E. Site:

(1) Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.

(2) Weekly, and more often if necessary, inspect all arrangements of materials stored on the site; restack, tidy, or otherwise service all arrangements to meet the requirements of subparagraph 3.1-A above.

(3) Maintain the site in a neat and orderly condition at all times.

F. Structures:

(1) Daily, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

(2) Daily, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand held broom.

(3) As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

(4) Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials have been installed. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Architect may be injurious to the finish floor material.

3.2 Final Cleaning

A. Definition: Except as otherwise specifically provided, "clean" for the purpose of this Article shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.

C. Site: Unless otherwise specifically directed by the Architect broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.

D. Structures:

(1) Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost.

(2) Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint drippings, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.

E. Glass: Clean all glass inside and outside.

F. Polished surfaces: To all surfaces requiring the routine application of buffed polish, apply the polish recommended by the manufacturer of the materials being polished.

G. Timing: Schedule final cleaning as approved by the Architect to accept a completely clean project.

End of Section 01710

DIVISION TWO – SITE WORK

SECTION 02200

EARTHWORK

PART ONE - GENERAL

1.1 Related Documents

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

B. Pad and Site Prep for this Project to be performed by the City of Alamosa Public Works Department as per this Section requirements. Excavation and backfill will be performed by Contractor.

1.2 Summary

A. Site Work to include the removal and export of existing soil in quantities shown on Drawings. Structural Fill as specified in this Section shall be imported, compacted in layers and installed under the Addition. Soils Test by a Soils Testing Lab is required as a part of the earthwork construction process.

B. Work Included: Includes all cleaning and grubbing, removal of obstructions, general excavations, grading and filling, pier drilling, and related items necessary to complete the grading for the entire project in accordance with these Specifications.

C. Location of Existing Utilities: Contractor shall locate and determine exact location of existing utilities on building site before excavation. Notify Architect immediately if there are deviations from drawings and if utilities will obstruct the work. Place markers to locate utilities and indicate location of disconnected services. Identify service lines and capping locations on Project Record Documents.

PART TWO – PRODUCTS

2.1 Soil Materials

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

PART THREE – EXECUTION

3.1 Excavation

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. NOTE that in this Project, existing soil is to be removed and replaced with structural fill to the depth and quality as specified in the Drawings and the Soils Report.

3.2 Stability of Excavations

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions of stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

3.3 Dewatering

A. Prevent surface water from flowing into excavations and from flooding project site and surrounding area.

(1) Do not water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

(2) Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

B. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.4 Excavation for Structures

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

3.5 Trench Excavation For Pipes and Conduit

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit.

B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil.

(1) For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit or undisturbed soil.

(2) For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom pipe for 90 degrees (bottom ¼ of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

3.6 Cold Weather Protection

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.7 Backfill and Fill

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

(1) Under building slabs, use non-expansive structural fill and granular fill as indicated on the drawings.

(2) Under piping and conduit and equipment, use non-expansive structural fill for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.

(3) Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are below bottom elevation of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

a. Concrete is specified in Division 3
b. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Architect. Use care in backfilling to avoid damage or displacement of pipe systems.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

(1) Acceptance of construction below finish grade including, where applicable, damp-proofing, and perimeter insulation.

(2) Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

(3) Removal of concrete formwork.

(4) Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structure and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

(5) Removal of trash and debris from excavation.

(6) Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.8 Placement and Compaction

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than I vertical to 4 horizontal so that fill material will bond with existing surface.

(1) When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture- condition to optimum moisture content, and compact to required depth and percentage of maximum density.

B. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Architect if soil density tests indicate inadequate compaction.

(1) Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 1557:

a. Under structures, building slabs and steps compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

(2) Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

a. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

b. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.9 Grading

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

C. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grade within a tolerance of ½ inch when tested with a 10-foot straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.10 Building Slab Granular Fill

A. Placing: Place granular fill material on prepared non-expansive structural fill in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

(1) When a compacted granular fill is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.11 Field Quality Control N/A

3.12 Inspection and Tests N/A

3.13 Erosion Control

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

3.14 Maintenance

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.15 Site Clearing

A. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil materials from Owner's property in legal manner.

End of Section 02200

SECTION 02450

ASPHALT PAVING

PART ONE - GENERAL

1.1 Summary

A. The work included under this Section includes the furnishings of all labor and materials necessary to complete the paving areas as described in the Drawings.

1.2 Related Sections

A. Section 02200 Site Preparation

1.3 Project Conditions

A. Install paving only when projected exterior temperature is above 40 degrees F for a 48 hour period following application.

B. Do not install on frozen surfaces or surfaces containing frost, or when it is raining. Install on dry and compacted surfaces.

1.4 Delivery, Storage and Handling

A. Deliver and install material directly from manufacturing plant continuing in truck quantities.

PART TWO - PRODUCTS

2.1 Materials

A. Asphalt – A cold mix asphalt material with aggregates sized ¾" to 3/8", comprising 75% to 85% of the mix volume, batched at asphalt plant and delivered promptly. Use (RAP) Recycled Asphalt Pavement material in mix, 15 – 25% of total volume.

PART THREE - EXECUTION

3.1 Installation

A. Install on dry, compacted soil that has been sloped to low side ½" / ft.

B. Deposit directly from truck via bobcat or other small loader.

C. Level surface with rakes placing material in one lift, so as there are no gaps, holes or honeycombing, presenting a smooth, level, hard surface for pedestrian traffic.

D. Compact mix with a hydrostatic drive system, keeping the operation smooth at all times. Achieve 92 – 97% density.

E. Trim edges evenly to finish with a smooth curve or straight edge as shown on Drawings.

End of Section 02450

DIVISION THREE - CONCRETE

SECTION 03100

CONCRETE FORMWORK

PART ONE – GENERAL

1.1 Summary

A. This Section includes the following:

(1) The formwork for all types of concrete work included in the project. Location and extent of concrete work is shown on the drawings.

B. Products installed but not supplied by this Section include the following:

(1) Embedded items.

C. Related Sections:

(1) Division 3 Section "Concrete Reinforcement" for concrete reinforcement.

(2) Division 3 Section "Cast-In-Place Concrete" for cast-in-place concrete.

1.2 References

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition or revision of each of the following publications shall be used.

(1) ACI 301 "Specifications for Structural Concrete for Buildings."

(2) ACI 318 "Building Code Requirements for Structural Concrete."

(3) ACI 347 "Recommended Practice for Concrete Formwork."

(4) ICBO "1997 Uniform Building Code" (UBC).

1.3 System Description

A. Design requirements:

Formwork shall be designed in accordance with methodology of ACI 347 for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface which meets the requirements of the type of finish specified in Division 3 Section "Cast-in-place Concrete." Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete without deformation or displacement.

1.4 Submittals

A. Design of formwork for structural stability and efficiency is Contractor's responsibility.

PART TWO – PRODUCTS

2.1 Form Materials

A. Forms for Class A or Class B Finish Concrete: Unless otherwise indicated, construct formwork for Class A or Class B finish concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

B. Forms for Class C or Class D Finish Concrete: Unless otherwise indicated, construct formwork for Class C or Class D finish concrete surfaces with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces depending on bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

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

(1) Provide units that will leave no metal closer than 1 ½ inches to the plane of the exposed concrete surface.

(1) Provide units that, when removed, will leave holes not larger than 1 ½ inches in diameter in the concrete surface.

(2) Provide units that, when removed, will leave holes no less than ½ inch deep.

(3) Chamfer Strips: Provide wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

PART THREE – EXECUTION

3.1 Forms

A. Design, erect, support, brace and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position in accordance with the tolerances for reinforced concrete buildings given by ACI 347. Maintain formwork construction tolerances for surface irregularities complying with the following ACI 347 limits:

(1) Provide Class A tolerances for concrete surfaces exposed to view.
(2) Provide Class C tolerances for other concrete surfaces.

B. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

C. Design, fabricate, and erect forms for easy removal without hammering prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

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 locations.

E. 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 items. Accurately place and securely support items built into forms.

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

G. Chamfer all external corners exposed to either view or wear in the finished structure with chamfer strips securely attached to the forms.

3.2 Installation of Embedded Items

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

3.3 Forms For Slabs

A. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.4 Preparation of Form Surfaces

A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

B. Coat contact surface of forms with an approved, non-residual, low-VOC, form releasing compound before placing reinforcement.

C. Thin form releasing compounds only with thinning agent of type, and in amount, and under conditions of form releasing compound manufacturer's directions. Do not allow excess form releasing material to accumulate in forms or to come into contact with concrete surfaces against fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

D. Coat steel forms with a non-staining, rest-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.5 Removal of Forms

A. Forms shall be removed in a manner that will prevent damage or injury to the concrete and ensure the complete safety of the structure. Formwork for columns, walls, sides of beams and other parts not supporting the weight of the concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before cumulatively curing at not less than 50 deg. F (10 deg. C) for at least 24 hours since concrete placement. Supporting forms and shores shall not be removed from beams, floors, or walls until the concrete has reached the design minimum compressive strength at 28 days as determined by the laboratory-cured cylinders required for concrete quality control a specified in Division 3 Section "Cast-in-place Concrete," unless the following requirements have been met:

(1) The concrete strength has reached 75 percent of design strengths as determined by field cured cylinders. The field-cured test specimens for form removal purposes shall be provided in numbers as directed, shall be in addition to those required for concrete quality control, and shall be done at no additional cost to the Owner.

3.6 Re-use of Forms

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. Use only reconditioned steel forms. Do not use steel forms which have lost alignment or which have been damaged so as to produce defects in the formed concrete surface.

C. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to A/E.

End of Section 03100

SECTION 03200

CONCRETE REINFORCEMENT

PART ONE – GENERAL

1.1 Summary

A. This Section includes the following:

(1) Steel reinforcing for all types of concrete work included in the Project. Location and extent of concrete reinforcement is shown on the drawings.

B. Related Sections:

(1) Division 3 Section "Concrete Formwork" for concrete formwork

(2) Division 3 Section "Cast-in-place Concrete" for cast-in-place concrete.

1.2 References

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition or revision of each of the following publications shall be used.

(1) ACI 301 "Specifications for Structural Concrete for Buildings."

(2) ACI 318 "Building Code Requirements for Structural Concrete."

(3) Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."

(4) ICBO "1997 Uniform Building Code" (UBC).

1.3 Submittals

A. Product Data: Submit manufacturer's product date with application and installation instructions for proprietary materials and items.

(1) Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

PART TWO – PRODUCTS

2.1 Reinforcing Materials

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Mechanical Splices: LENTON taper threaded rebar splices as manufactured by ERICO PRODUCTS, INC., or approved equal.

D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.

(1) For slabs-on grade, use chairs with 22 gage sand plates.

(2) For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

PART 3 – EXECUTION

3.1 Placing Reinforcement

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.

(1) Avoid cutting or puncturing vapor retarder/barrier during reinforcement placement. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers as required.

D. Place reinforcement to obtain minimum coverages as specified in ACI 318 for concrete protection unless noted otherwise on the drawings. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install mechanical splices according to manufacturer's recommendations and in such a manner that the splices comply with the requirements of ACI 318-95.

End of Section 03200

SECTION 03300

CAST-IN-PLACE CONCRETE

PART ONE – GENERAL

1.1 Summary

A. This Section specifies the following:

(1) All types of cast-in-place concrete, including mix design, placement procedures, and finishes in the Project. The location and extent of the concrete work is shown on the drawings.

B. Related Sections:

(1) Division 3 Section "Concrete Formwork" for formwork for cast-in-place concrete.

(2) Division 3 Section "Concrete Reinforcement" for reinforcement for cast-in-place concrete.

1.2 References

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition or revision of each of the following publications shall be used.

(1) ACI 117 "Standard Tolerances for Concrete Construction and Materials."

(2) ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete."

(3) ACI 211.2 "Standard Practice for Selecting Proportions for Structural Lightweight Concrete."

(4) ACI 301 "Specifications for Structural Concrete for Buildings."

(5) ACI 302.1R "Guide for Concrete Floor and Slab Construction."

(6) ACI 305R "Hot Weather Concreting."

(7) ACI 306R "Cold Weather Concreting."

(8) ACI 318 “Building Code Requirements for Structural Concrete.”

(9) Concrete Reinforcing Steel Institute, “Manual of Standard Practice.”

(10) ICBO “1997 Uniform Building Code” (UBC).

1.3 Quality Assurance

A. Concrete Testing:

(1) Materials and installed work may require testing and retesting, as directed by A/E, at any time during progress of work.

(2) Allow free access to material stockpiles and facilities. Tests, including retesting of rejected materials and installed work, shall be done at Contractor’s expense.

B. Codes and Standards: Comply with provisions of the following publications, except where more stringent requirements are shown or specified:

(1) ACI 301 “Specifications for Structural Concrete for Buildings.”

(2) ACI 318 “Building Code Requirements for Structural Concrete.”

(3) Concrete Reinforcing Steel Institute, “Manual of Standard Practice.”

(4) ICBO “1997 Uniform Building Code” (UBC).

PART TWO – PRODUCTS

2.1 Concrete Materials

A. Portland Cement: ASTM C 150, Type II, unless otherwise acceptable to A/E.

(1) Use one brand of cement throughout Project, unless otherwise acceptable to A/E.

B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

(1) Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the A/E.

C. Water: Drinkable.

D. Air Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with all other admixtures or combinations of admixtures used in the mix.

E. Water-Reducing Admixture: ASTM C 494, Type A, certified by manufacturer to be compatible with all other admixtures or combinations of admixtures used in the mix, and containing not more than 0.1% chloride ions.

F. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G, certified by manufacturer to be compatible with all other admixtures or combinations of admixtures used in the mix, and containing not more than 0.l1% chloride ions.

G. Water Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, certified by manufacturer to be compatible with all other admixtures or combinations of admixtures used in the mix, and containing not more than 0.1% chloride ions.

H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, certified by manufacturer to be compatible with all other admixtures or combinations of admixtures used in the mix, and containing not more than 0.1% chloride ions.

I. Coloring Agent: ASTM C 979, synthetic mineral oxide pigments or colored water-reducing admixtures, color stable, nonfading, resistant to lime and other alkalis, certified by manufacturer to be compatible with all other admixtures or combinations of admixtures used in the mix, and containing nor more than 0.1% chloride ions.

J. Calcium chloride or admixture containing more than 0.1% chloride ions are not permitted.

2.2 Related Materials

A. Reinforcement: Concrete reinforcement is specified in Division 3 Section "Concrete Reinforcement."

B. Non-Shrink Grout: CRD-C 621 or ASTM 1107, factory pre-mixed grout.

C. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

(1) Provide material that has a maximum volatile organic compound (V)C) rating of 350 g/L.

(2) Provide material that will not alter the appearance of the concrete surface and will not yellow with age or when exposed to environmental conditions.

(3) Provide material that is compatible with subsequent surface treatments, coverings and adhesives.

(4) Provide material that is designed to seal and dustproof the concrete surface in addition to forming a curing membrane.

D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

(1) Waterproof paper.

(2) Polyethylene film.

(3) Polyethylene-coated burlap.

E. Bonding Agent: Polyvinyl acetate or acrylic base, re-wettable type.

F. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

G. Expansion Joint Filler: Provide premolded material conforming to ASTM D 1751 or ASTM D 1752. Unless otherwise indicated, filler material shall be ½ inch thick and a width applicable for the joint formed.

2.3 Proportioning and Design of Mixes

A. Admixtures:

(1) Use water-reducing admixtures in concrete as required for placement and workability.

(2) Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg. F (10 deg. C)

(3) Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1 ½% of that specified in Drawings.

(4) Use admixtures for water-reducing, coloring, and set-control in strict compliance with manufacturer's directions.

B. Slump Limits: Proportion and design mixes to result in concrete slump as required for proper placement and consolidation.

2.4 Concrete Mixing

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94 and as specified.

(1) During hot weather comply with the recommendations of ACI 305.

(2) During cold weather comply with the recommendations of ACI 306.

PART THREE – EXECUTION

3.1 Joints

A. Control Joints in Slabs-On –Ground: Construct control joints in slabs-on-ground to form panels of patterns as shown. Provide joints 1/8" wide x ¼ of slab depth, unless otherwise indicated.

(1) Form control joints by tooling during the placement and finishing operations.

B. Expansion Joints: Place expansion joints as shown on the drawings. Filler material shall extend for the full depth and length of the joint.

3.2 Concrete Placement

A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. General: Comply with ACI 304 "Guide for Measuring, Mixing, Transporting and Placing Concrete," and as herein specified.

D. Placing Concrete In Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

(1) Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

(2) Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

(3) Maintain reinforcing in proper position during concrete placement.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

(1) Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

(2) Bring slab surfaces to correct level, free of humps or hollows.

(3) Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold Weather Placement: Comply with ACI 306 and as follows:

(1) Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures.

(2) When air temperature has fallen to or is expected to fall below 40 deg. F (4 deg. C), maintain concrete mixture temperature of not less than 50 deg. F (27 deg. C) at point of placement.

(3) Do not use frozen materials or materials containing ice or snow.

(4) Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

(5) Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

G. Hot Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete in compliance with ACI 305 and as follows:

(1) Maintain concrete temperature at time of placement to below 90 deg. F (32 deg. C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

(2) Maintain temperature of reinforcing steel at less than the ambient air temperature immediately before embedding in concrete.

(3) Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to A/E.

3.3 Finishing Formed Surfaces

A. Rough-Formed Finish: Provide rough-formed concrete surfaces concealed by other construction or not exposed to view in the finish work, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material, with tie holes and defective areas repaired and patched. Rut down or chip off fins and other projections exceeding ¼" in height.

B. Smooth-Formed Finish: Provide smooth-formed concrete surfaces exposed to view in the finished Work or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is an as-cast concrete surface obtained with selected form facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

3.4 Monolithic Slab Finishes

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive mortar setting beds for tile.

(1) After placing slabs, finish surface so the depressions between high spots do not exceed one-half inch under a 10 foot long straight edge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, and stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified.

(1) After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared and when concrete has stiffened sufficiently. Consolidate surface with power-driven floats, or by hand-floating. Check and level surface plane so that depressions between high spots do not exceed 5/16 of an inch under a 10 foot long straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film finish coating system.

D. Non-Slip Broom Finish: Apply non-slip broom finish to interior or exterior concrete steps, waling surfaces, and ramps unless otherwise indicated.

(1) Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required finish with A/E before application.

3.5 Concrete Curing and Protection

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

(1) When air temperature is greater than 80 deg. F (27 deg. C), or when wind is gusting over 15 miles per hour, completely coat slab surface with evaporation control compound. Use compound in strict accordance with manufacturer's recommendations.

(2) Start initial curing as soon as free water has disappeared from concrete surface after finishing.

(3) 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 curing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as specified.

(1) Provide curing compound to interior slabs with resilient flooring, carpet over cushion, or interior slabs exposed to view, unless other wise indicated; and to exterior slabs, walks, and curbs, as follows:

a. Use membrane curing compound that will not affect surfaces to be covered with finish materials applied directly to concrete.
b. Apply specified curing compound to concrete slabs as soon as final finishing operations are complete. Apply uniformly in continuous operation in accordance with manufacturer's directions. Re-coat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

(2) Provide moist curing by one or more of the following methods:

a. Keep concrete surface continuously wet by covering with water.
b. Continuous water-fog spray.
c. Covering concrete surface with specified absorptive cover, thoroughly saturate absorptive cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, overlap adjacent absorptive covers.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar 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.

D. Curing Unformed Surfaces:

(1) Cure unformed surfaces, such as slabs, and other flat surfaces by applying curing compound.

3.6 Miscellaneous Concrete Items

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

3.7 Concrete Surface Repairs

A. Patching Defective Areas: Repair and patch defective areas immediately after removal of forms, when acceptable to A/E.

B. Use proprietary patching compound acceptable to A/E or dry-pack mortar to patch defective areas. Dry-pack mortar shall consist of one part Portland cement to 2 ½ parts fine aggregate passing a No. 16 sieve and only enough water as required for handling and placing.

C. Cut out honeycomb, rock pockets, voids over one-quarter inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than one inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and apply specified bonding agent.

D. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching.

E. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of A/E. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock packets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Fill form tie holes with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

(1) Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as specified Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.

(1) Repair finish unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

(2) Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days

(3) Correct low areas in unformed surfaces by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to A/E.

(4) Repair defective areas, except random cracks and single holes not exceeding 1-1/2 inches in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at ¾ inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

(5) Repair isolated random cracks and single holes not exceeding 1-1/2 inches in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours. Proprietary patching compounds may be used when acceptable to A/E.

G. Perform structural repairs with prior approval of A/E for method and procedure, using specified epoxy adhesive mortar.

H. Repair methods not specified above may be used, subject to acceptance by A.E.

3.8 Acceptance of the Structure

A. If all concrete work is performed as shown and specified, acceptance of the structure will be based upon the recommendations of ACI 301 except as follows:

(1) When inadequate curing and protection of concrete is indicated by strengths of field-cured cylinders falling to less than 85 percent of companion laboratory-cured cylinders, the strength of the structure shall be investigated as directed by A/E, or shall be replaced, at no additional cost to the Owner. Such investigation may include, but is not limited to, testing or cored specimens or non-destructive testing. Acceptance of the structure shall be determined by A/E.

B. Concrete work not performed as shown and specified shall be replaced at no additional cost to the Owner, unless otherwise acceptable to A/E.

End of Section 03300

DIVISION FIVE – METALS

SECTION 05100 – METAL STUD FRAMING

PART ONE – GENERAL

I.1 Summary

A. Work included under this section includes the providing and installing of all metal stud partitions as indicated on Drawings.

I.2 Related Sections

A. Section 09200 Gypsum Board

1.3 Delivery, Storage and Handling

A. Deliver to site in manufacturer's unopened containers or bundles, fully identified with name and brand type or grade. Store off ground in a dry ventilated space or protect with impervious covering. Protect metal framing from rust and damage.

PART TWO – PRODUCTS

2.1 Available Manufacturers

A. Dale Industries, Inc.

B. Dietrich Industries, Inc.

C. USG Industries

D. Unimast, Inc.

E. Wheeling Corrugating, Inc.

2.2 Materials

A. System Components: Manufactured standard non-load bearing steel studs of size, type, shape and gauge indicated. With each type of metal framing required, provide manufacturer's standard steel runners (tracks), blocking, headers, reinforcements, shoes, clip angles, fasteners, and accessories for applications indicated, as needed to provide a complete metal framing system.

B. Materials and Finishes

1. 18 gauge interior walls, ASTM A446, Grade A with a minimum yield point of 33000 psi.
2. Provide galvanized finish to metal framing components, ASTM A525 for minimum G 60 coating.
3. Finish of installation accessories to match that of main framing components, unless otherwise indicated.
4. 16 gauge ceiling joists, ASTM A446, Grade C, 40000 psi.

C. Fasteners: Provide nuts, bolts, screws, washers, and other fasteners with corrosion resistant finish.

D. Electrodes for welding: comply with AWS Code and as recommended by stud manufacturer.

2.3 Fabrication

A. General: Framing components maybe pre-fabricated into assemblies before erection. Fabricate panels plumb, square, true-to-line, and braced against raking. Perform lifting of prefabricated units to prevent damage or distortions.

1. Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.

B. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Do not field weld units of 20 gauge or lighter. Wire tying of framing members is not permitted.

1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting weld work.
2. Locate mechanical fasteners and size fasteners according to manufacturer's instructions.

PART THREE – EXECUTION

3.1 Installation

A. General: Install cold formed metal framing and accessories plumb, square, true-to-line and with connections securely fastened, in accordance with manufacturer's recommendations.

B. Runner tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs.

1. Secure tracks as recommended by stud manufacturer for type of construction involved, spacing not to exceed 24" on-center for nail or power-driver fastener, or 16" on-center for other types of fasteners. Provide fasteners at corners and ends of tracks.
2. All track butt joints, abutting pieces of track shall be securely anchored to a common structural element or they shall be spliced together.

C. Wall Studs: Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.

1. Set studs plumb, except as needed for diagonal bracing.
2. Where stud system abuts structural walls or columns, including masonry walls, anchor ends of stiffeners to supporting structure.
3. Axially loaded studs shall have full bearing against the inside web of top and bottom tracks. Splices in axial loaded studs are not permitted.

End of Section 05100

DIVISION SIX – WOOD

SECTION 06100

ROUGH CARPENTRY

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Work Included:

A. All plates, blocking, and framing throughout the Project.

B. All wood beams, wood decking, and trusses.

C. Wood trim and roof decking.

D. Wall sheathing, paneling, roof decking, paneling adhesive, and all miscellaneous nails, connectors, and carpentry items not specified elsewhere.

PART TWO – PRODUCTS

2.1 Wood

A. Sizes of common boards and framing lumber shown on the drawings are nominal unless specifically dimensioned. All lumber shall be designated S4S unless indicated as rough sawn or worked to such patterns as are indicated on the drawings.

B. All lumber shall be seasoned: Trim lumber shall contain less than twelve percent moisture; framing lumber shall have a maximum moisture content of less than nineteen percent. Surface green lumber will not be acceptable.

C. Lumber shall bear the grade and trademark of an inspection agency certified by the American Lumber Standards Committee and a mark of mill identification.

D. All lumber shall be protected, ventilated, and kept under cover at the job site.

E. Grades and Species: In accordance with the 1974 Standard Grading Rules of the Western Wood Products Association, the following grades and species of lumber shall be acceptable with minimum stress as shown:

USE	GRADE	f_b	E	SPECIES
(1) Studs 2x4	#2	1000	1.0	Hem-Fir
(2) Studs 2x6, 2x8, 2x12	#2	1000	1.0	Hem-Fir
(3) Plates, Sills and Misc.	#2	1000	1.0	Hem-Fir
(4) Floor Joists				BCI 400
(5) Roof Joists				BCI 400 joists
(6) Lam. Wood Beams	Versa-Lam	3100	2.0	

F. Sizes: As shown on Drawings.

2.2 Roof Deck

A. Sizes as shown on Drawings, exterior grade DFPA or equal Plywood with structural characteristics stamped on plywood and in accordance with spans shown on Drawings. Use ply-clips or solid blocking at all plywood unsupported edges.

B. Tongue and Groove roof decking, 2 x 6 pine or spruce to match existing in grade and appearance.

2.3 Fasteners

A. Bolts and Nuts: ASTM A 307, Grade A, or A325, as noted.

B. Anchor Bolts: ASTM F 1554, Grade 36.

C. Machine Screws: ASME B 18.6.3

D. Wood Screws: ASME B 18.6.1

2.4 Galvanized Metal Straps

A. 1” wide by 16 gage strap brace shall be placed at all exterior corners on interior face of studs at 45 degrees.

B. Use 8d nails at each stud.

2.5 Grout

A. Non-shrink, non-metallic grout, ASTM C 1107.

2.6 Adhesive

A. DAP, ASTM C 557-73 construction adhesive.

PART THREE – EXECUTION

3.1 Anchors

A. Anchors shall be installed where specified shown, or required to anchor carpentry to concrete.

B. Bolts for anchoring exterior plates to concrete shall be one-half inch by ten inches, spaced not more than 4’0” on center, with minimum of two bolts per each piece of plate. All plates shall be treated for moisture protection.

3.2 Framing

A. Framing lumber and other rough work shall be properly framed, closely fitted, accurately set to required lines and levels, and rigidly secured in place. Members shall be framed for the passage of pipes and ducts to avoid cutting structural members. No framing members shall be cut, notched, or bored for the passage of pipes and conduits without permission of the Architect unless detailed in the Drawings. Framing members damaged by cutting shall be reinforced. Special framing or construction not explicitly shown or specified shall be provided as required to complete work in the best and most workmanlike manner. Nailing and spiking shall be done in a thorough manner, with nails of ample size, in accordance with best practice of the trade. Where required corner bracing shall meet all governing code requirements and shall be a metal steel strap 1” wide from top place to bottom plate on each interior face of exterior corners.

B. Use adhesive and screws on all floor plywood, attaching to floor joists.

End of Section 06100

SECTION 06200

FINISH CARPENTRY

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes the following:

(1) Interior woodwork/trim as noted on Drawings.

PART TWO – PRODUCTS

A. Wood species for Opaque Finish: Any closed-grain hardwood, sugar pine or western white pine.

PART THREE – EXECUTION

3.1 Preparation

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

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 Installation

A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork level, plumb, true and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2300 mm).

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

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extend possible. Do not use pieces less than 60 inches (1500 mm) long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

(1) Fill gaps, if any, between top and base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.

(2) Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

3.3 Adjusting and Cleaning

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

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

End of Section 06200

DIVISION SEVEN – THERMAL AND MOISTURE PROTECTION

SECTION 07200

THERMAL PROTECTION - BUILDING INSULATION

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes the following:

(1) Cavity wall and roof insulation.

(2) Concealed building insulation.

(3) Perimeter Stem wall insulation.

1.3 Delivery, Storage and Handling

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:

(1) Do not expose to sunlight, except to extent necessary for period of installation and concealment.

(2) Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.

(3) Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART TWO – PRODUCTS

2.1 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

(1) Extruded-Polystyrene Board Insulation:

a. DiversiFoam Products (Tapered 'Raylite' Positive Drainage)
b. Dow Chemical Company
c. Owens Corning

(2) Glass-Fiber Insulation:

a. CertainTeed Corporation
b. Johns Manville Corporation
c. Knauf Fiber Glass
d. Owens Corning

(3) Vapor barrier in building crawl space; black polyvinyl cover on ground as manufactured by Owens-Corning; 6 mil thickness.

2.2 Insulating Materials

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

(1) Performed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

B. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:

(1) Type X, 1.30 lb/cu. Ft. (21 kg/cu. M.).

2.3 Auxiliary Insulating Materials

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

(1) Plate: Perforated galvanized carbon-steel sheet, o.030 inch (0.762 mm) thick by 2 inches (50 mm) square.

(2) Spindle: Cooper-coated, low carbon steel, fully annealed, 0.150 inches (2.67 mm) in diameter, length to suit depth of insulation indicated.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016 inch (0.41 mm) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.

(1) Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:

a. Ceiling Plenums
b. Attic spaces
c. Where indicated

D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of dimension indicated between face of insulation and substrate to which anchor is attached.

(1) Air Space: 1 inch (25 mm).

E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART THREE – EXECUTION

3.1 Installation, General

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

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

D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 Installation of Perimeter and Under-Slab Insulation

A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

(1) If not indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line and 24 inches horizontally around interior or perimeter wall.

B. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set adhesive according to insulation manufacturer's written instructions.

C. Protect top surface of horizontal insulation from damage during concrete work by applying protection board.

3.5 Installation of General Building Insulation

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

B. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

(1) Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

D. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:

(1) Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

(2) Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

(3) For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

(4) Insulate all interior walls full thickness with acoustic batt insulation to bottom of ceiling or roof deck as it occurs.

E. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

(1) Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.

(2) Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.

(3) After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.

(4) Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

F. Stuff glass-fiber, loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. Ft. (40 kg/cu. m.).

3.6 Protection

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

3.7 Insulation Schedule

A. Exterior walls: 8" thick (or full wall thickness as indicated) x 16" glass fiber batts, kraft paper faced. Double layers of un-faced back-fill and faced layer is acceptable. R-25, flanged edge.

B. Foundation: 2" thick by 24" x 96" sheets extruded polystyrene. R-10, tongue and groove edge.

C. Concealed Roof: Multiple layers, glass fiber rolls, R-38, faced with foil/scrim/kraft. Flanged rafters.

D. Interior Walls: Full wall thickness (3 ½", multiple layer) un-faced glass fiber acoustic batts. Insulate all walls. Insulate walls to underside of structure where structure permits.

Note: Install RC-1 sound channel on interior walls between Cemetery Business Office and Waiting and Records.

End of Section 07200

SECTION 07400

SHEET METAL ROOFING

PART ONE- GENERAL

1.1 Summary of Work

A. To furnish and install metal roof and trim as shown on Drawings.

1.2 Quality Assurance

A. Inspect metal roof panels on delivery to insure all edges are intact, the color is the specified color, and for moisture. If there is moisture, separate the panels and dry them. If shipping damage is found, the carrier should be advised and a notation made on the bill of lading.

1.3 Deliver, Storage and Handling

A. Deliver roof panels in mesh reinforced covering and strapped with vinyl strapping bands to protect the factory applied finish. Do not drag panels across the finished surface of one another. Prolonged storage of sheets in bundles is not recommended. If conditions do not permit immediate erection, extra care must be taken to protect the material from damage caused by moisture. Store bundles only in a dry place or use a properly draped canvas tarpaulin that allows air flow to prevent condensation.

1.4 Warranty

A. ABC 20 year limited warranty.

PART TWO – PRODUCTS

2.1 Manufacturer

A. Roofing metal and trim by Federal or equal, 7505 E. Harvard Ave, Denver, CO 80231, Office: 720.475.1354 ext. 239, Zach Turner.

B. Panel Profile: Rugged Rib.

C. Roofing metal gauge: 26 ga, 80,000 psi, Grade E steel.

D. NOT USED

E. Screw fasteners: ¼" hex head x 2" self-driller with neoprene washer, color of head to match roofing panel color. Use 80 screws/square.

F. Closure foam strips at roof ridge and cave: strip mastic 3/8" x 3/32".

G. Sealant tape to be applied to side laps and end laps.

H. Trim: Ridge, plain ridge cap. Eave: Denver Eave Trim. Color of trim to match roof color.

I. Color: To be selected by Architect.

PART THREE – EXECUTION

3.1 Installation

A. Cutting: Portable profile shear for cross cutting. Power saw cutting from reverse side only.

B. Use 9 inches of lap minimum.

C. Drip edge at eave: minimum of 3 inches overhang.

D. Install first sheet square with eave and away from prevailing winds, working from eave to ridge.

E. Fasten top and bottom of panel to deck and then proceed to fasten panels with fasteners to withstand minimum 90 mph winds per IBC Code Section 1609.

F. Avoid over-driving screw fasteners creating panel distortion.

G. Cleaning: Clean and sweep all debris, cut metal strips, etc. off roof and site at completion of job.

End of Section 07400

DIVISION EIGHT – DOORS

SECTION 08100

STEEL DOORS AND FRAMES

PART ONE – GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, apply to this Section.

1.2 Summary

A. This Section includes the following:

(1) Steel Doors.

(2) Steel Door Frames, whether wood doors or steel doors.

B. Related Sections include the following:

(1) Section 8 Door Hardware.

(2) Section 9 Gypsum Board.

(3) Section 9 Painting.

1.3 Submittals

A. Shop Drawings. Show the following:

(1) Elevations of each door design.

(2) Details of doors including vertical and horizontal edge details.

(3) Frame details for each frame type.

(4) Details and locations of reinforcement and preparations for hardware.

(5) Coordination of glazing frames and stops with glass and glazing requirements.

B. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.4 Quality Assurance

A. Steel Door and Frame Standard: Comply with ANSI A 250.8.

1.5 Delivery, Storage and Handling

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inch (100 mm) high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum ¼ inch (6 mm) spaces between stacked doors to permit air circulation.

PART TWO- PRODUCTS

2.1 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into Work include, but are not limited to, the following:

(1) Steel Doors and Frames:

a. Exterior Frames: Timely.
b. Exterior Doors: Timely (full glass).
c. Interior Frames: Timely knock down type by Timely Industries, see Section 8200 for interior wood doors.

2.2 Doors

A. General: Provide doors of sizes, thicknesses, and designs indicated.

B. Interior Doors: 1-3/4 inch thick.

C. Exterior Doors: 1-3/4 inch thick.

2.3 Frames

A. General: Provide steel frames for doors and transoms as shown on Drawings.

(1) Finish: See Paint Schedule.

B. Gauges:

(1) Exterior Doors 16 ga.

(2) Interior Doors 16 ga.

(3) Frames 16 ga.

C. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.

D. Supports and Anchors: Fabricated from not less than 0.042 inch (1.0 mm) thick, electrolytic zinc-coated or metallic-coated steel sheet.

2.4 Fabrication

A. General: Fabricate steel door and frame units to comply with ANSI 1250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

B. Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053 inch (1.3 mm) thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.

C. Interior Door and Panel Faces: Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from the following material:

(1) Cold-rolled steel sheet, unless otherwise indicated.

(2) Metallic-coated steel sheet where indicated.

D. Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.

E. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than ¼ inch (6.4 mm) between pairs of doors. Not more than ¾ inch (19 mm) at bottom.

F. Clearances for Fire-Rated Doors: As required by NFPA 80.

G. Single-Acting, Door-Edge Profile: Square edge.

H. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

I. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

J. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

K. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 2236 or ASTM C 976 on fully operable door assemblies.

(1) Unless otherwise indicated, provide thermal-rated assemblies with U-value of 0.41 Btu/sq. ft. x h x deg. F (2.33 W/sq. m x K) or better.

L. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

M. Frame Construction: Fabricate frames to shape shown.

(1) Fabricate frames and mitered or coped and continuously welded corners and seamless face joints.

(2) For exterior applications, fabricate frames with mitered or coped and continuously welded corners and seamless face joints.

(3) Provide welded frames with temporary spreader bars.

(4) Provide terminated stops, unless otherwise indicated.

N. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

O. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

P. Glazing Stops: Manufacturer's standard, formed from 0.032 inch (0.8 mm) thick steel sheet.

(1) Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

(2) Provide screw-applied, removable, glazing stops on inside of glass, louvers, and other panels in doors.

Q. Astragals: As required by NFPA 80 to provide fire ratings indicated.

PART THREE – EXECUTION

3.1 Installation

A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

(1) Except for frames located in existing walls or partitions, place frames before construction of enclosing walls and ceilings.

(2) In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.

(3) For openings 90 inches (2286 mm) or more in height, install an additional anchor at hinge and strike jambs.

C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.

(1) Fire-Rated Doors: Install within clearances specified in NFPA 80.

3.2 Adjusting and Cleaning

A. Prime-Coat Touchup: Immediately after installation, sand smooth and rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

End of Section 08100

SECTION 08200

WOOD DOORS

PART 1 – GENERAL

1.1 Related Documents

A. Drawings and General Provisions of the Contract, including General, Special and Supplementary Conditions, apply to this Section.

1.2 Summary

A. This Section includes the following:

(1) Solid core interior birch flush wood doors.

(2) Accordion Door.

B. Related Sections include the following:

(1) Division 8 Steel Frames.

(2) Division 9 Painting.

1.3 Submittals

A. Shop Drawings: Indicate location, size, and hand of each door, design and elevation.

(1) Indicate dimensions, locations of mortises and holes for hardware.

(2) Indicate fire rating for fire doors.

1.4 Delivery, Storage and Handling

A. Package doors individually in plastic bags or cardboard cartons.

1.5 Project Conditions

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.6 Warranty

A. Manufacturer's and Contractor's warranty that guarantees to repair or replace doors that are defective in materials or workmanship and that have warped (bow, cup or twist) more than ¼ inch in a 36 x 84 section.

(1) Warranty shall include installation and finishing that may be required due to repair or replacement of defective doors.

(2) Warranty shall be in effect during the following period of time: from date of substantial completion.

PART TWO – PRODUCTS

2.1 Manufacturers

A. Companies:

(1) Weyerhauser Company

PART THREE – EXECUTION

3.1 Installation

A. Job Fitted Doors: Align and fit doors with uniform clearances. Provide 1/8 inch to3/16 inch uniform space at heads, jambs and between doors. Provide ¼ inch uniform space from bottom of door to top of metal threshold.

B. Adjusting:

(1) Operation: Re-hang or replace doors that do not swing or operate freely.

(2) Finished Doors: Replace doors that are damaged or do not comply with requirements. Door may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

End of Section 08200

SECTION 08361

SECTIONAL OVERHEAD DOORS

PART ONE – GENERAL

1.1 Summary

A. The work included under this section includes the manufacturing and installation of the sectional overhead garage door as shown on the Drawings.

B. Related Sections:

(1) Section 05100, Metal Studs

(2) Section 09250, Gypsum Wallboard

(3) Section 09990, Painting

PART TWO – PRODUCTS

2.1 Manufacturers

A. Overhead door to be as manufacturer by Overhead Door Company of Denver, 3291 Peoria St., Aurora, CO 80010 303.951.4923.

2.2 Material

1. 20 ga. Steel door panels.
2. Insulated R-10.
3. Heavy duty track and hardware
4. Flexible PVC bottom weatherseal.
5. Baked on polyester paint finish.
6. Individual tampered panel glazing as shown on Drawings.
7. Higher cycle springs of 25k.
8. Wind loading with 20 psf standard.

9. Electric hoist operation (RHX operator, UL 3252010, ¾ hp)

10. 3” wide galvanized track

11. Sup-UR seal jamb seals

PART THREE – EXECUTION

2.1 Installation as per manufacturer recommendations.

End of Section 08361

SECTION 08500

WINDOWS AND GLAZING

PART ONE – GENERAL

1.1 Summary

C. The work included under this section includes the manufacturing and installation of windows and glazing, interior and exterior. Contractor to note that these new windows are to be installed in existing openings and that the dimensions given on the Plans are approximate only. Confirm new window sizes by site measurements.

D. Related Sections:

(4) Section 06100, Rough Carpentry

(5) Section 07240, Stucco

(6) Section 09250, Gypsum Wallboard

(7) Section 09990, Painting

PART TWO – PRODUCTS

2.1 Manufacturers

A. Windows and window frames shall be as manufactured by Glass Rite,
808 Gibson, SE, Albuquerque, NM 87102, 505.515.3502. Sizes and types as specified on plans. The windows comply with AAMA/NWWDA 101 – I.S.2 – 97 specifications for CC-55 designation.

2.2 Material

A. Main frame and panel members shall be of aluminum extruded alloy 6063-T5.

B. See Window Schedule on Drawings for Glazing Specifications.

2.3 Finish

A. Frame and panel members shall be dark white. The electrostatically painted and baked enamel finish shall meet AAMA 603.8 specifications for pigmented organic finishes.

2.4 Construction

A. Main frame and panel members are machined and joined at corners by screws fastened into integral screw bosses. Frame corners to be sealed full perimeter.

2.5 Hardware

A. To be of aluminum, stainless steel, or other corrosion-resistant material. Operators by Truth, Inc.

2.6 Weatherstripping

A. To conform to AAAMA 701.

2.7 Security

A. Operable windows over 30" in height to be equipped with 2 Truth Locks. Windows under 30" to have one lock.

2.8 Glazing

A. **Operable Windows** shall be glazed with dual seal ¾" insulated glass. Insulated glass to have Edgetech warm edge spacer as a secondary seal and a butyl primary seal. Glass shall be secured and sealed in panel by a channel type, soft vinyl gasket.

B. **Fixed Exterior Windows:** 1" insulated glass with snap-in dividers, as shown on Drawings.

C. Fixed Interior Glazing: 1/4" tempered glass.

2.9 Screens

A. Windows shall be furnished with roll-form aluminum screen frames and charcoal screening.

2.10 Energy Performance Data

A. Thermally broken aluminum frame,
Double glazed, low E coating,
U factor 0.35,
Solar Heat Gain Coefficient 0.31,
Visible Transmittance 0.45

PART THREE – EXECUTION

3.1 Installation

A. Install windows as per manufacturer's recommendations.

End of Section 08500

SECTION 08700

FINISH HARDWARE

PART 1 – GENERAL

1.1 Description

A. Related Work:

(1) Cabinet Hardware: Section 06400 Architectural Cabinets.

1.2 Submittals

A. Hardware Schedule: Within 10 days after receipt of a contract for the finish hardware, prepare a complete schedule and submit 8 copies of the hardware schedule with 3 copies of catalogue cuts, highlighted to show each different hardware item to the Architect for review.

B. Do not order hardware until an approved copy of the schedule is returned to the supplier bearing the approval of the Architect.

(1) This schedule shall indicate the following details:

Door numbers	Frame materials
Location	Hand of door
Size and thickness of door	Degree of opening
Door material	Type of attachment

C. Templates: After receipt of the approved corrected hardware schedule, upon request the hardware supplier shall send 4 sets of templates and corrected hardware schedule to the general contractor for distribution to the wood door, metal door, and frame manufacturers/suppliers.

D. Maintenance Manuals: Furnish 1 copy of maintenance manual covering the finish hardware for this Project. The manual shall consist of printed sheets from the hardware manufacturer bound in a three-ring binder and properly indexed.

(1) Include the following information in the maintenance manuals:

a. Address and telephone number of the hardware supplier.
b. Address and telephone number of each hardware manufacturer.

c. Maintenance instructions and parts list for each type of operating hardware including:

1) Locks
2) Exit Devices
3) Closers
4) Warranty for closers and all other hardware.

1.3 Delivery, Storage and Handling

A. Deliver hardware to the job site only after proper provision for storage has been made. NO DIRECT SHIPMENTS WILL BE ALLOWED.

B. Properly package and clearly identify each item relative to the hardware schedule.

C. The hardware supplier shall authorize his representative to be present when all finish hardware is delivered to the job site and shall check-in each item and turn over to the General Trades Contractor for storage in a secure place under lock and key.

1.4 Warranty

A. Furnish 3 copies of the following written warranty to be included in the Maintenance Manual:

(1) Warranty against mechanical failure of exit devices for a 3 year period.

(2) Warranty against mechanical failure of door closers for a 10 year period.

(3) Warranty against mechanical failure of locksets for a 5 year period.

(4) Warranty against failure of parts of all hardware except exit devices, locksets, and door closers for a 2 year period.

(5) Starting date for all warranty periods to be the date of substantial completion of building by Architect.

PART TWO – PRODUCTS

2.1 Acceptable Manufacturers

A.	Butts:	Bommer, Hager, Stanley	BO
B.	Exit Devices:	Von Duprin VD	

C.	Door Closers:	LCN	L
D.	Locksets:	Schlage	S
E.	Thresholds & Weatherstrip:	National Guard, Reese, Zero, Pemko	NG
F.	Stops & Door Trim:	Glynn Johnson, Trimco, Rockwood	GJ
G.	O/H Stops:	Glynn Johnson, ABH, Rixson	GJ
H.	Push/Pull Plates	Hager	HA

OTHER MANUFACTURERS BY PRIOR APPROVAL OF THE ARCHITECT AND LISTED IN AN ADDENDUM.

2.2 Scheduled Hardware

A. Requirements for design: grade, function, finish, size, and other distinctive qualities of each type of Builders Hardware is indicated in the Hardware Schedule at the end of this Section. Products are identified by using manufacturers hardware product numbers.

B. Manufacturer's Product Designation: One or more manufacturers are listed for each hardware type required. The initial after the manufacturer's name indicates whose product designation is used in the Hardware Schedule for purposes of establishing minimum requirements. Provide either the product designated or where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in the Section.

2.3 Materials and Fabrication

A. Hand of Door: The drawings show the direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.

B. Fasteners: Manufacture hardware to conform to published templates generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping screws except as specifically indicated.

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

a. Sex Bolts: Install door closer, door holders, and exit devices on ALL doors by means of thru bolts and sex nuts.

(2) Provide concealed fasteners for hardware units which are exposed when the door is closed except to the extent no standard units of the type specified are available with concealed fasteners. Do not use thru bolts for installation where the bolt head or the nut on the opposite face is exposed in other work except where it is not feasible to adequately reinforce the work.

2.4 Butts, Hinges and Pivots

A. Templates: Provide only template produced units.

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

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

(1) Steel Hinges: Steel pins

(2) Non-ferrous Hinges: Stainless steel pins

(3) Exterior Doors: Non-removable pins (NRP)

(4) Interior Doors: Non-rising pins

(5) Tips. Flat button and matching plug finished to match leaves

D. Number of hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90" or less in height and 1 additional hinge for each 30" of additional height.

E. Size of hinge leaves: 4.5" high, except 5" for doors over 3'6" wide.

F. Width of hinges: Shall be sufficient to clear trim projection when door swings 180 degrees.

G. Fire Rated doors over 8'0" shall have heavy weight hinges.

H. All hinges SHALL be made of steel and have steel ball bearings where specified.

2.5 Keying

A. The hardware supplier shall make available to the Architect and/or Owner a representative for the purpose of consulting and reviewing the Project's keying requirements and make a written proposal of the complete key system.

B. Proposed key plan shall include expansion potential for the Owner's future requirements.

C. All locksets and cylinders SHALL be keyed to a Masterkey system and to the instructions as provided by the Architect/Owner. All locksets and cylinders shall be construction masterkeyed.

D. Keys Required: Furnish quantity of keys as follows:

(1) Five (5) Master Keys

(2) Three (3) keys per lock or cylinder.

(3) Fifteen (15) construction keys.

E. Grandmaster, master, and change keys shall be stamped with their respective set symbol.

F. All keys shall be made of nickel silver.

2.6 Cylindrical Locksets

A. HEAVY DUTY.

B. Heavy Duty Cylindrical Locks and Latches: Schlage "D" Series. Fastened with through-bolts and threaded chassis hubs.

C. Chassis: Cylindrical design, corrosion-resistant plated cold rolled steel.

D. Locking spindle: Stainless steel, interlocking design.

E. Latch Retractors: Forged steel. Balance of inner parts: Corrosion-resistant plated steel, or stainless steel.

F. Lever Trim: Accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.

G. Locks shall be of such construction that when locked, the door may be opened from within by using lever and without the use of a key or special knowledge.

H. Springs: Full compression type.

I. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.

2.7 Exit Devices

A. Exit devices: Von Duprin as scheduled with push-through pad design, no exposed touch bar fasteners, no exposed cavities when operated.

B. Device push bar must release when a force of 32 pounds, or less, of pressure is applied when a force of 250 pounds is applied to the door.

C. Device shall bear UL label for fire and or panic as may be required.

D. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.

E. Lever Trim: "Breakaway" design forged brass or bronze escutcheon with a minimum of .130" thickness, match lockset lever design.

F. Removable Mullions: Removable with single turn of building key, securely reinstalled without need for key.

G. Furnish glass bead kits for vision lights where required. Devices for flush doors must fit flat on the door.

2.8 Closers

A. Closers: LCN. All door closers shall be of one manufacturer to provide for proper installation and servicing after installation. All closers shall be inspected after installation by a representative to ensure proper adjustment and operation. Closers shall carry a manufacturer's ten year warranty against manufacturing defects and workmanship.

B. Door closer cylinders shall be of high strength cast iron construction to provide low wear operating capabilities of internal parts, throughout the life of the installation.

C. ALL HEAVY DUTY door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 5/8 of an inch and piston diameter of 1-1/2 inches to ensure longevity and durability under all closer applications. Closer shall utilize full complement bearings at shaft to provide greatest load carrying capabilities of the shaft. Pinion and pistons shall be hardened to provide durable wearing surfaces. For hydraulic regulation, the closer shall incorporate tamper resistant, non-critical, screw valves of V-slot design to reduce possible clogging from particles within the closer. Closers shall have separate and independent screw valves for latch speed, general speed, and hydraulic backcheck. Parallel arm backcheck will be accomplished with an additional selector valve which will properly locate backcheck so as to effectively slow the swing of the door at a minimum of 10" in advance of the dead stop location to protect the door frame and hardware from damage.

D. Closers shall be non-handed and shall be capable of mounting on hinge side, top jamb, stop side or on a bracket. The single decorative, non-corrosive cover furnished with each unit shall be interchangeable between all four mountings so that closer location can be revised by building maintenance personnel without purchase of additional parts.

E. Closers shall have only one templated location for each mounting application to accommodate all available degrees of opening, except detailed with a built-in positive stop which must be templated for stop positions of 85 degrees up 110 degrees of door opening.

F. Maximum effort to operated doors shall not exceed 8.5 lbs. For exterior doors and 5 lbs for interior doors, such pull or push effort being applied at right angles to hinged doors. All closers shall be adjusted to operate with the minimum amount of force required to properly close and latch doors.

G. Provide sex-bolted or through bold mounting for all door closers.

2.9 Miscellaneous Door Trim Units

A. Material shall be brass, bronze or stainless steel as appropriate for required finish. Brass bronze material to be 0.050" minimum thickness and stainless steel to be 0.050" minimum thickness. Edges of plates to be beveled and polished except lower edge can be square.

B. Width of plates shall be 2" less than door width.

C. Push Plates: Plate shall be 4" x 16".

D. Pull Plates: Plate shall be 4" x 16". Grip shall be extruded or cast bronze or stainless steel located on center of plate.

E. Smoke Seal shall be a self-adhesive SILICONE material measuring 3/8" x ¼".

2.10 Tools For Maintenance

A. Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance and removal or replacement of finish hardware.

PART THREE- EXECUTION

3.1 Installation

A. General: All finish hardware shall be installed by the General Contractor.

B. Furnish all items of hardware with attachment screws, bolts, nuts, etc., as required to attach hardware to type of material involved and with finish to match hardware with which they are to be used. Make all attachments to metal by template machine screws.

C. Provide sex nuts and bolts for door closers, forearm shoes of closers, and holding devices.

D. Attach hardware to masonry or concrete with expansion bolts or similar drilled anchors to develop full strength of attached device.

E. Run weatherstripping or soundstripping full height of both jambs and full width of head. Run thresholds full width of opening. Run door bottoms full width of doors. Set expansion anchors in solid masonry, not mortar joints. Set thresholds in caulking by sealant contractor.

3.2 Protection

A. Do not install door silencers, kickplates, pushplates, door bottoms, and wall stops until after painting is complete. Loosen locksets and panic hardware prior to painting and re-tighten after painting is complete. Mask all hardware or otherwise protect during painting operation.

3.3 Adjust and Clean

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

Hardware Set Number 1

Doors Number 1, 2, 3 and 12, to have:

	Quantity	Number	Finish	Mgfr.
Butt Hinges	3 ea.	BB1168 4.5x4.5NRP	626	Hager
Lockset (lever)	1 ea.	5408 LNPB	US626	Yale
Closer	1 ea.	D-4550-EPA	AL	Ryobi
Silencers	6 ea.	307D Mtl. Fr.	Grey	Hager
Integral Frame Weatherstripping				
Sweep Strip	1 ea.	315 CN 36	628	PEM
Door Stop	1 ea.	232W concave	626	Hager

Hardware Set Number 2

Doors Number 4, 5, 8, 9, 10, 11, and 13 each to have:

	Quantity	Number	Finish	Mgfr.
Butt Hinges	3 ea.	BB1168 4.5x4.5	626	Hager
Lockset (lever)	1 ea.	5408 LNPB	US26D	Yale
Silencers	6 ea.	307D Mtl. Fr.	Grey	Hager
Door Stop	1 ea.	232W concave	AL	Hager

Hardware Set Number 3

Doors Number 6 and 7 each to have:

	Quantity	Number	Finish	Mgfr.
Butt Hinges	3 ea.	BB1168 4.5x4.5	626	Hager
Silencers	6 ea.	307D Mtl. Fr.	Grey	Hager
Door Stop	1 ea.	232W concave	626	Hager
Closer	1 ea.	D-4550-EDA	AL	Ryobi
Lockset (lever)	1 ea.	5408 LNPB	US26D	Yale

Hardware Set Number 4

Doors Number 12 to have:

	Quantity	Number	Finish	Mgfr.
Butt Hinges	3 ea.	BB1168 4.5x4.5	626	Hager
Lockset (lever)	1 ea.	5408 LNPB	US26D	Yale
Silencers	6 ea.	307D Mtl. Fr.	Grey	Hager
Door Stop	1 ea.	232W concave	AL	Hager
Closer	1 ea.	D-4550-EDA	AL	Ryobi

End of Section 08700

DIVISION NINE – FINISHES

SECTION 09200

GYPSUM BOARD

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes the following:

(1) Interior gypsum wallboard.

(2) Tile backing panels.

B. Related Sections include the following:

(1) Division 6 Section "Rough Carpentry" for wood framing and furring.

1.3 Delivery, Storage and Handling

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and another causes. Stack gypsum panels flat to prevent sagging.

PART TWO – PRODUCTS

2.1 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

(1) Gypsum Board and Related Products:

a. American Gypsum Co.
b. G-P Gypsum Corp.
c. National Gypsum Company.
d. United States Gypsum Co.

2.2 Interior Gypsum Wallboard

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard: ASTM C 36.

(1) Regular Type:

a. Thickness: ½" inch unless otherwise indicated.
b. Long Edges: Tapered.
c. Location: As indicated.

(2) Type X:

a. Thickness: 5/8 inch (15.9 mm).
b. Long Edges: Tapered.
c. Location: Where required for fire-resistance-rated assembly.

2.3 Tile Backing Panels

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M.

(1) Core: 5/8 inch (15.9 mm), Type X.

2.4 Trim Accessories

A. Interior Trim: ASTM C 1047.

(1) Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.

(2) Shapes:

a. Bullnose corner bead: Use at outside corners.
b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
c. Expansion (Control) Joint: Use where indicated.

2.5 Joint Treatment Materials

A. General: Comply with ASTM C 475.

B. Joint Tape:

(1) Interior Gypsum Wallboard: Paper.

(2) Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

(1) Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.

(2) Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

(3) Fill Coat: For second cost, use drying-type, all-purpose compound.

(4) Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

(1) Water-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.

(2) Cementitiuos Backer Units: As recommended by manufacturer.

PART THREE – EXECUTION

3.1 Applying and Finishing Panels, General

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.

B. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

F. Attach gypsum panels to framing provided at openings and cutouts.

G. Form control and expansion joints with space between edges of adjoining gypsum panels.

H. Cover both faces of partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

(1) Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scarps of not less than 8 sq. ft. (0.7 sq. m) in area.

(2) Fit gypsum panels around ducts, pipes, and conduits.

(3) Where partitions intersect open structural members projecting below underside of roof decks, cut gypsum panels to fit profile formed by structural members; allow ¼ to 3/8 inch (6.4 to 9.5 mm) wide joints to install sealant.

I. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide ¼ to ½ inch (6.4-12.7 mm) wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

J. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

(1) Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

K. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

L. Unless otherwise indicated, all walls are to receive 5/8" Type X gypboard.

3.2 Panel Application Methods

A. Single-Layer Application:

(1) On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.

(2) On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistant-rated assembly, and minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of board.
b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistant-rated assembly.

B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

D. Tile Backing Panels:

(1) Water-Resistant Gypsum Backing Board: Install at lavatories, wet walls, and where indicated. Install with ¼ inch (6.4 mm) gap where panels abut other construction or penetrations.

(2) Cementitiuos Backer Units: ANSI A108.11, at showers, and where indicated.

(3) Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.

(4) Where tile backing panels abut other types of panels in the same place, shim surfaces to produce a uniform plane across panel surfaces.

3.3 Installing Trim Accessories

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings.

3.4 Finishing Gypsum Board Assemblies

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated.

(1) Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies.

(2) Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.

(3) Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges in mechanical and janitor rooms.

(4) Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

3.5 Applying Texture Finishes

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns. Unless otherwise indicated, finish walls with knock-down texture.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture finish manufacturer's written recommendations.

End of Section 09200

SECTION 09511

ACOUSTICAL CEILING

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes acoustical panels and exposed suspension systems for ceilings.

1.3 Submittals

A. Product Data: For each type of product indicated.

(1) Ceiling suspension members.

(2) Method of attaching hangers to building structure.

a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

B. Samples for Initial Selection: For components with factory-applied color finishes.

(1) Acoustical Panel: Set of 6-inch (150 mm) square Samples of each type, color, pattern, and texture.

(2) Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch (300 mm) long Samples of each type, finish, and color.

C. Maintenance Data: For finishes to include in maintenance manuals.

1.4 Quality Assurance

A. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.

1.5 Delivery, Storage and Handling

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 Project Conditions

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

(1) Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.7 Coordination

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 Extra Materials

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

(1) Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.

(2) Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART TWO – PRODUCTS

2.1 Mineral-Base Acoustical Panels For Acoustical Panel Ceiling APC-1

A. Available Products:

(1) Armstrong Cortega, #769A.

(2) CertainTeed Baroque.

B. Color: White as selected from manufacturer's full range.

C. LR: Not less than 0.80.

D. NCR: Not less than 0.55.

E. CAC: Not less than 35.

F. Edge Detail: Square.

G. Thickness: ¾ inch (19 mm).

H. Size: 24 by 48 inches (610 by 1220 mm).

I. Antimicrobial Treatment: Coating based.

2.2 Metal Suspension System, General

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 636.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide Manufacturer's standard factory-applied finish for type of system indicated.

(1) High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environmental Performance" where high humidity finishes are indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

(1) Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

(2) Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.

(3) Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than o.135 inch (3.5 mm) diameter wire.

PART THREE – EXECUTION

3.1 Examination

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 Installation, General

A. Suspend ceiling hangers from building's structural members and as follows:

(1) Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

(2) Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

(3) Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

(4) Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

(5) Secure wire hangers to structural members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

(6) Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type or hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

(7) Do not attach hangers to steel deck tabs.

(8) Do not attach hangers to steel roof deck. Attach hangers to structural members.

B. Secure bracing wires to structural members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

(1) Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

(2) Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.66 mm). Miter corners accurately and connect securely.

(3) Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

(1) Arrange directionally patterned acoustical panels as follows:

a. As indicated on reflected ceiling plans.

(2) For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

(3) Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

(4) Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 Cleaning

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

End of Section 09511

SECTION 09651

RESILIENT FLOOR TILE

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes the following:

(1) Vinyl composition tile (VCT).

(2) Resilient wall base and accessories.

1.3 Delivery, Storage and Handling

A. Store resilient products and installation materials in dry spaces protected from the weather, and ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg. F (10 deg. C) or more than 90 deg. F (32 deg. C).

1.4 Project Conditions

A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg. F (21 deg. C) or more than 95 deg. F (35 deg. C), in spaces to receive floor tile during the following time periods.

(1) 48 hours before installation.

(2) During installation.

(3) 48 hours after installation.

B. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg. F (13 deg. C) or more than 95 deg. F (35 deg. C).

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor installation.

E. Install resilient products after other finishing operations, including painting, have been completed.

1.5 Extra Materials

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

(1) Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

(2) Resilient Wall Base and Accessories: Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART TWO – PRODUCTS

2.1 Manufacturers

A. Available Products: Subject to compliance with requirements, products that may be incorporated into Work include, but are not limited to, the products listed in other Part 2 articles.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 Colors and Patterns

A. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.3 Vinyl Composition Tile VCT-1

A. Vinyl Composition Tile (VCT): ASTM F 1066.

(1) Armstrong World Industries, Inc.; Imperial Texture Standard Excelon.

(2) Azrock Commercial Flooring, DOMCO; Cortina Standard Tile.

(3) Congoleum Corporation; CX Series.

(4) Mannington Mills, Inc.; Essentials.

(5) Tarkett Inc.; Expressions.

B. Class: 2 (through-pattern tile).

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch (3.2 mm).

E. Size: 12 by 12 inches (305 by 305 mm).

F. Fire-Test-Response Characteristics:

(1) Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.4 Resilient Wall Base

A. Wall Base: ASTM F 1861.

(1) Armstrong World Industries, Inc.; Rubber Wall Base.

(2) Burke Mercer Flooring Products; Rubber Maid.

(3) Johnsonite; Rubber Wall Base.

(4) Marley Flexco (USA), Inc.; Wallflowers.

(5) Roppe Corporation; Series 700.

(6) VPI, LLC, Floor Products Division.

B. Type (Material Requirement): TS (rubber, vulcanized thermoset).

C. Group (Manufacturing Method): I (solid, homogeneous) or II (layered).

D. Style: Cove (with top-set toe).

E. Minimum Thickness: 0.125 inch (3.2 mm).

F. Height: 4 inches (152 mm).

G. Lengths: Cut lengths 48 inches (1219 mm) long or coils in manufacturer's standard length.

H. Outside Corners: Job formed or premolded.

I. Surface: Smooth.

2.5 Resilient Molding Accessory

A. Description: Nosing for resilient floor covering; reducer strip for resilient floor covering.

(1) Burke Mercer Flooring Products.

(2) Johnsonite.

(3) Marley Flexco (USA), Inc.

(4) Roppe Corporation.

(5) Stoler Industries.

B. Material: Vinyl.

C. Profile and Dimensions: Manufacturers Standard.

2.6 Underlayment: ½" AD plywood screwed 8" o/c edge and field, with 1-5/8" long screws.

2.7 Installation Materials

A. Trowel-able Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART THREE – EXECUTION

3.1 Examination

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

(1) Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

(2) Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 Tile Installation

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

(1) Lay tiles square with room axis.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

(1) Lay tiles with grain running in one direction.

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosing.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. Maintain referenced markers, holes, openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, non-staining marking device.

F. Install tiles on covers for telephone and electrical ducts and similar items in furnished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing or adhesive spreader marks, and other surface imperfections.

3.4 Resilient Wall Base Installation

A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

B. Install wall base in lengths as long as possible without gaps at seams and with tops of adjacent pieces aligned.

C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

D. Do not stretch wall base during installation.

E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.

F. Premolded Corners: Install premolded corners before installing straight pieces.

G. Job-Formed Corners:

(1) Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.

(2) Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.5 Resilient Accessory Installation

A. Perform the following operations immediately after completing resilient product installation.

(1) Remove adhesive and other blemishes from exposed surfaces.

(2) Sweep and vacuum surfaces thoroughly.

(3) Damp-mop surfaces to remove marks and soil.

Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

(1) Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive and surface blemishes as recommended in writing by manufacturer.

a. Use commercially available product acceptable to manufacturer.
b. Coordinate selection of floor polish with Owner's maintenance service.

(2) Cover Products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

(3) Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

End of Section 09651

SECTION 09680

CARPET

PART ONE – GENERAL

1.1 Related Documents

A. Drawings and General Provisions of the Contract, Special Conditions, Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 Summary

A. This Section includes the following:

(1) Carpet and pad.

1.3 Submittals

A. Product Data: For each type of product indicated.

B. Samples for initial selection: For each type of product indicated.

1.4 Delivery, Storage and Handling

A. Store resilient products and installation materials in dry places protected from the weather with ambient air temperatures greater than 50 deg. F.

1.5 Extra Materials

A. All scrap material from installation shall be returned to Owner.

PART TWO – PRODUCTS

2.1 Materials

A. Carpet shall be as follows: 100% nylon low-level loop, meeting FHA Bulletin U.M. 44C. Carpet shall be standard color and pattern. The Architect shall select a maximum of 4 different colorations. Carpet shall have a flame spread rating of 75 or less, as tested in accordance with ASTM E-84, "Standard Method of Test for Surface Burning Characteristics of Building Materials". This test method is similar to that specified in ASA 2.5 NFPA No. 255 UL No. 723, and UBC No. ". This test method is similar to that specified in ASA 2.5 NFPA No. 255 UL No. 723, and UBC No. 42-1. Pile yarn weight, 24 oz.; maximum pile height, . 250". Density 3600. Weight density factor 79,200. Provide Architect certification of the carpet in compliance with U.M. 44C, Type III, Class 1, for living units.

B. Padding: Carpet, full size of carpet area, shall be laid over 3/8" rebond pad meeting FHA requirements.

C. Anchors: Carpet nailing strip anchors shall be the product of a standard manufacturer for edge nailing at all confining walls.

D. Seams: Thermoplastic seaming tape shall be used at all seams.

E. Carpet shall be installed per manufacturer's recommendations and in compliance with FHA Bulletin U.M. 44C.

F. Carpet may be short shag or low-level loop in 24 oz. weight and in compliance with U.M. 44C.

PART THREE – EXECUTION

3.1 Installation

A. Mailing strips as carpet anchors shall be installed before cushion or padding is laid. Padding shall be fitted tight to nailing strips around the entire perimeter of the room and carpeting shall be laid over the padding. Carpeting shall have a seamless appearance, shall be cut full to fit tight against all walls and shall be installed by a workman skilled in this operation.

3.2 Completion

A. Edge of carpet at all door openings shall be bound in a metal edge strip designed for such carpet edging and shall be securely anchored to the floor.

3.3 Clean-up

A. Upon completion of carpet installation, the contractor shall remove all cuttings and scraps and shall clean the carpeted surface using a suitable type vacuum cleaner for this purpose. Protect carpet surface with paper or plastic sheets until all construction has been completed.

3.4 Extras

A. Provide an extra 4 yards per color to be left with the Owner for repair, and Carpet manufacturer shall furnish a maintenance manual.

End of Section 09680

SECTION 09900

PAINTING (Professional Line Products)

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

(1) Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

(2) Section includes the epoxy painting of concrete floors as indicated in the Room Finish Schedule.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If color or finish is not indicated, Architect will select from standard colors and finishes available.

(1) Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

(1) Prefinished items include the following factory-finished components:

a. Architectural woodwork.
b. Metal toilet enclosures.
c. Finished mechanical and electrical equipment.
d. Light Fixtures.

(2) Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Furred areas.
b. Ceiling plenums.

(3) Finished metal surfaces include the following:

a. Anodized aluminum.
b. Stainless Steel.
c. Chromium plate.
d. Copper and copper alloys.
e. Bronze and brass.
f. Galvanized steel.

(4) Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.
b. Linkages.
c. Sensing devices.
d. Motor and fan shafts.

(5) Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

(1) Division 8 Section "Custom Steel Doors and Frames" for factory priming interior steel doors and frames.

(2) Division 9 Section "Gypsum Board Assemblies" for surface preparation of gypsum board.

E. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.3 Definitions

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

(1) Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.

(2) Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 Submittals

A. Product Data: For each paint system indicated.

(1) Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

(2) Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Initial Selection: For each type of finish-coat material indicated.

(1) After color selection, Architect will furnish color chips for surfaces to be coated.

(2) Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.

(3) Submit Three Samples on the following substrates for Architect's review of color and texture only:

a. Ferrous Metal: 3-inch (75 mm) square Samples of flat metal and 6-inch (150 mm) long Samples of solid metal for each color and finish.

1.5 Delivery, Storage and Handling

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

(1) Product name and title of material.

(2) Product description (generic classification on binder type).

(3) Manufacturer's stock number and date of manufacture.

(4) Contents by volume, for pigment and vehicle constituents.

(5) Thinning instructions.

(6) Application instructions.

(7) Color name and number.

(8) VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg. F (7 deg. C). Maintain storage containers in a clean condition, free of foreign materials and residue.

(1) Protect from Freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.6 Project Conditions

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg. F (10 and 32 C).

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg. F (7 and 35 C).

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg. F (3 deg. C) above the dew point; or to damp or wet surfaces.

(1) Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.7 Extra Materials

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

(1) Quantity: Furnish Owner with 2 gallons of each color and type applied.

PART TWO – PRODUCTS

2.1 Manufacturers

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

C. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles.

(1) PPG Industries, Inc. (Pittsburgh Paints).

(2) Sherwin-Williams Co. (Sherwin-Williams)

(3) Dunn-Edwards (Wellborn).

2.2 Paint Materials, General

A. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

(1) Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material date and certificates of performance for proposed substitution.

B. Colors: As selected by Architect from manufacturer's full range.

2.3 Exterior Primers

A. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.

(1) Pittsburgh Paints; 90-712 Pitt-Tech One Pack Interior/Exterior Primer Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils) 0.076 mm).

(2) Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

(3) Dunn-Edwards; Quik Dry #22 Industrial Primer. Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

2.4 Interior Primers

A. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.

(1) Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).

(2) Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

(3) Dunn-Edwards: Proseal W102 Interior Pigmented Sealer applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

B. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.

(1) Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 1.5 mills (0.038 mm).

(2) Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

(3) Dunn-Edwards; International Interlac 260 Alkyd Rust Inhibitive Primer – White. Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

2.5 Exterior Finish Coats

A. Exterior Full-Gloss Alkyd Enamel: Factory-formulated full-gloss alkyd enamel for exterior application.

(1) Pittsburgh Paints; 7-814 Pittsburgh Paints Industrial Gloss-Oil Interior/Exterior Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

(2) Sherwin-Williams; Industrial Enamel B-54 Series: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).

(3) Dunn-Edwards; Syn-Lustro Alkyd Gloss Industrial Maintenance Coating (10 Series). Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).

2.6 Interior Finish Coats

A. Interior Semi-gloss Acrylic Enamel: Factory-formulated semi-gloss acrylic-latex enamel for interior application.

(1) Pittsburgh Paints; 6-5000 Series SpeedHide Interior Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).

(2) Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).

(3) Dun-Edwards; Pro-Crylic Interior/Exterior Acrylic Semi-Gloss #W1152. Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).

B. Interior Full-Gloss Acrylic Enamel: Factory-formulated full-gloss acrylic-latex interior enamel.

(1) Pittsburgh Paints; 6-8534 SpeedHide Interior Latex 100 Percent Acrylic Gloss Enamels: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).

(2) Pittsburgh Paints; 90-374 Pitt-Tech One Pack Interior/Exterior High Performance Waterborne High Gloss DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

(3) Sherwin-Williams; ProMar 200 Interior Latex Gloss Enamel B21W210: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

(4) Dunn-Edwards; Peramgloss Interior/Exterior 100% Acrylic Gloss Enamel #W960. Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

C. Interior Semi-gloss Alkyd Enamel: Factory-formulated semi-gloss alkyd enamel for interior application.

(1) Pittsburgh Paints; 6-1110 Series SpeedHide Interior Enamel Wall & Trim Semi-Gloss Oil: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).

(2) Sherwin-Williams; ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200 Series: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).

(3) Dunn-Edwards; Syn-Lustro Alkyd Semi-Gloss Industrial Maintenance Coating (9 Series). Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).

D. Interior Full-Gloss Alkyd Enamel for Gypsum Board: Factory-formulated full-gloss alkyd interior enamel.

(1) Pittsburgh Paints; 7-814 Series Pittsburgh Paints Industrial Gloss-Oil Interior/Exterior Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

(2) Sherwin-Williams; ProMar 200 Alkyd Gloss Enamel B35W200 Series: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

(3) Dunn-Edwards; Syn-Lustro Alkyd Gloss Industrial Maintenance Coating (10 Series). Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

E. Interior Full Gloss Alkyd Enamel for Metal Surfaces: Factory-formulated gull-gloss alkyd interior enamel.

(1) Pittsburgh Paints; 7-814 Series Pittsburgh Paints Industrial Gloss-Oil Interior/Exterior Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

(2) Sherwin-Williams; ProMar 200 Alkyd Gloss Enamel B35W200 Series. Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

(3) Dunn-Edwards; Syn-Lustro Alkyd Gloss Industrial Maintenance Coating (10 Series). Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

F. Concrete Floor

(1) Sherwin-Williams Armor Seal 1000 HS Epoxy 2 coat, 3.0 mil, gloss, solvent epoxy, surface preparation SSPC-SP13 or NACE6 Standard.

PART THREE – EXECUTION

3.1 Examination

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.

(1) Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

(2) Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

(1) Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 Preparation

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface–applied protection before surface preparation and painting.

(1) After completing painting operations in each space or area, reinstall items removed using workers skilled in trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

(1) Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

(1) Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants;. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

(1) Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

(2) Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. In necessary, remove surface film and strain material before using.

(3) Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coast of same material are applied. Tint undercoat to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 Application

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

(1) Paint colors, surface treatments, and finishes are indicated in the paint schedules.

(2) Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

(3) Provide finish coats that are compatible with primers used.

(4) The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

(5) Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

(6) Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.

(7) Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

(8) Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

(9) Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

(10) Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

(1) The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

(2) Omit primer over metal surfaces that have been shop primed and touchup painted.

(3) If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

(4) Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has cried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

(1) Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.

(2) Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.

(3) Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:

(1) Uninsulated ferrous metal piping.

(2) Ferrous metal pipe hangers and supports.

(3) Tanks that do not have factory-applied final finishes.

(4) Duct, equipment, and pipe insulation having "all service jacket" or other paintable jacket material.

(5) Mechanical equipment that is indicated to have a factory-primed finish for field painting.

G. Electrical items to be painted include, but are not limited to, the following:

(1) Electrical equipment that is indicated to have a factory-primed finish for field painting.

H. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat printed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearances, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

(1) Provide satin finish for final coats.

J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 Cleaning

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

(1) After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.5 Protection

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finished. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

(1) After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 Exterior Paint Schedule

A. Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):

(1) No Finish.

B. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.

(1) Full-Gloss Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.

a. Primer: Exterior ferrous-metal primer.
b. Finish Coats: Exterior full-gloss alkyd enamel.

C. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces.

(1) No Finish.

D. Aluminum: Provide the following finish systems over exterior aluminum surfaces:

(1) No Finish.

3.7 Interior Paint Schedule

A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

(1) Semi-gloss Acrylic-Enamel Finish: Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior semi-gloss acrylic enamel.

B. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces.

(1) Full-Gloss Acrylic-Enamel Finish: Two finish coats over a wood primer.

a. Primer: Interior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes.
b. Finish Coats: Interior full-gloss acrylic enamel.

C. Ferrous Metal: Provide the following finish system over ferrous metal:

(1) Full-Gloss Alkyd-Enamel Finish: Two finish coats over a primer.

a. Primer: Interior ferrous-metal primer.
b. Finish Coats: Interior full-gloss alkyd enamel for wood and metal surfaces.

D. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces.

(1) No Finish.

E. Contractor may select either acrylic or alkyd finish materials for interior gypsum wallboard finish.

F. Painting Contractor to notify Architect for painting color schedule before commencing work.

End of Section 09900

DIVISION TEN – SPECIALITIES

SECTION 10100

SIGNS

PART ONE – GENERAL

1.1 Scope: to provide signs and letters for:

A. Rest Room signs

B. No Smoking Sign. See Drawings for placement.

C. Owner will provide and install room designated signs.

PART TWO - PRODUCTS

2.1 Manufacturer

A. Restroom, no smoking signs as mfgr. By Fast Signs, www.fastsigns.com High impact styrene no. 09003 Black. Dble. Adhesive back, 6" X9".

B. Main Building Sign – sign letters by A.R.K. Ramos signage systems 1321 S. Walker Oklahoma City, OK 73109, 800.725.7266, www.arkramos.com.

PART THREE – EXECUTION

3.1 Mounting

A. 6" H, ½" DP, no 508 Satin Brass F-7 sign to read: City of Alamosa; 12" H, 7/8" DP, no 525 Medium Bronze F-6M sign to read: Parks and Cemetery Office.

B. Mount letters in locations shown on Exterior Elevations and as per manufacture's recommendations.

End of Section 10100

SECTION 10520

FIRE PROTECTION

PART ONE – GENERAL

1.1 Summary

A. This Section includes the following:

(1) Fire extinguisher wall mounted. Furnish and install.

PART TWO – PRODUCTS

2.1 Manufacturer

A. Fire extinguisher and as manufactured by J. L. Industries, 4450 W. 78th Circle, Bloomington, MN 55435, 612-835-6850. Cosmic Multi-Purpose ABC Dry Chemical 5 lbs. model in recessed cabinet.

B. Materials:

(1) Cabinet: Panorama 1012P48 steel ADAC Option. Fire-Ex Option, electrostatic with white epoxy finish primer, rolled edge construction 2 ½ RT. Door Style: C70. Door glazing: white background with red letters.

PART THREE – EXECUTION

3.1 Furnish and install quantities as described on Drawings.

End Section 10520

SECTION 10600

ACCESSORIES

PART ONE – GENERAL

1.1 Scope

To provide and install Pad-Style Snow Guards by:

Alpine Snow Guards
289 Harrel Street
Morrisville, VT 05661
(888) 766-4273
www.alpinesnowguards.com

Use #30 half round snow guards, Galvalume color. Install as per mfgr. recommendations as to spacing and placement.

End Section 10600

SECTION 10800

TOILET ACCESSORIES

PART ONE – GENERAL

1.1 Related Documents

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

2.2 Summary

A. This Section includes the furnishing and installation of the following:

(1) Toilet Partitions

(2) Toilet Accessories

PART TWO – PRODUCTS

A. Toilet Partitions – Bobrick

B. Toilet Accessories – Bobrick Washroom Equipment, Inc., 11611 Hart Street, North Hollywood, CA 91605, 818.982.9600

C. Model numbers as follows:

(1) Toilet Partitions: Classic series, plastic laminate, floor-anchored configurations, sizes as shown on Drawings. Color to be chosen by Architect.

(2) Toilet Accessories:

a. Grab Bars: B106 Series exposed mounting, satin finish, sizes as shown on Drawings

b. Tissue Paper Holder: B4288 Surface mounted double roll dispenser, stainless steel satin finish

c. Soap Dispenser: B-822 34 fl oz. Lavatory mounted dispenser. 4” spot length with under counter reservoir system

d. Towel Dispenser / Disposal: B-3944 satin finish, stainless steel

e. Seat Cover Dispenser: by Bobrick, model no. not available

f. Mirrors: B-165 4836, 48”x36” channel framed

PART THREE – EXECUTION

3.1 Installation

A. Follow all manufacturer's installation recommendations carefully. All accessories to be installed plumb and level. Provide solid backing for grab bars.

DIVISION ELEVEN – EQUIPMENT

SECTION 11400

APPLIANCES

PART ONE – GENERAL

1.1 Scope:

A. To provide a full size refrigerator

PART TWO – PRODUCTS

2.1 Materials:

A. Refrigerator to be specified during construction.

End Section 11400

DIVISION THIRTEEN – SPECIAL CONSTRUCTION

SECTION 13125

METAL BUILDING SYSTEMS

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes the following:

(1) Structural framing

(2) Roof panels

(3) Wall panels and liners

(4) Insulation, installed in exterior, perimeter walls, foundation and roof

(5) Building components, as follows:

a. personnel doors, frames and hardware
b. service doors, frames and hardware
c. windows
d. louvers, vents and ventilators

(6) Accessories and trim

B. Related Sections include the following:

(1) Division 3 Section “Cast –in-Place Concrete” for concrete foundations and anchor-bolt installation.

(2) Division 4 Section “Unit Masonry” for masonry walls

(3) Division 7 Section “Building Insulation” for insulation installed as part of the building enclosure

(4) Division 8 Section “Door Hardware” for finish door hardware and keying not standard with metal building system manufacturer

(5) Division 8 Section “Glazing” for glass and glazing not standard with metal building systems manufacturer

(6) Division 9 Section “Painting” for shop-applied finishes not standard with metal building system manufacturer

1.3 System Performance Requirements

A. General: Provide a complete, integrated set of metal building system manufacturer’s standard mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, roof and wall panels and accessories complying with requirements indicated, including those in this Article.

B. Metal Building System Design: Of size, spacing, slope and spans indicated and as follows:

(1) Primary frame type: Provide the following:

a. Rigid Clear Span: solid-member structural framing system without interior columns.

(2) End-Wall Framing: Engineer end walls to be expandable. Provide primary frame, capable of supporting full-bay design loads and end-wall columns.

(3) Secondary Frame Type: Manufacturer’s standard rafters and the following girts:

a. Exterior-framed (bypass) and flush girts

(4) Eave Height: Manufacturer’s standard height, as indicated by nominal height on Drawings.

(5) Bay Spacing: As determined by manufacturer

(6) Roof Slope: see Exterior Elevations

(7) Roof System: Manufacturer’s standard roof panels 26 ga., 80,000 psi, Grade E roof panels with insulation.

(8) Exterior Wall System: manufacturer’s standard field-assembled insulated wall panels, 26 ga., 80,000 psi, Grade E.

C. Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

(1) Engineer metal building systems according to procedures in MBMA's "Low Rise Building Systems Manual"

(2) Design Loads: As indicated

D. Thermal Performance: Provide metal building roof and wall assemblies with the following thermal-resistance values (R-value):

(1) Roof Assemblies: R-38

(2) Wall Assemblies: R-25

E. Air Infiltration for Roof Panels: Provide roof panel assemblies with permanent resistance to air leakage through assembly of not more than 0.09 cfm/sq.ft. (0.45 L/s per sq.m.) of fixed roof area when tested according to ASTM E 1680 at a static-air-pressure difference of 4 lbf/sq.ft (192 Pa).

F. Air Infiltration for Wall Panels: Provide wall panel assemblies with permanent resistance to air leakage through assembly of not more than 0.09 cfm/sq.ft. (0.45 L/s per sq.m.) of fixed wall area when tested according to ASTM E 1680 at a static-air-pressure difference of 4 lbf/sq.ft (192 Pa).

G. Water Penetration for Roof Panels: Provide roof panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 1646 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. (300 Pa) and not more than 12 lbf/sq.ft (575 Pa).

H. Water Penetration for Wall Panels: Provide wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 331 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. (300 Pa) and not more than 12 lbf/sq.ft (575 Pa).

I. Wind-Uplift Resistance: Provide roof panel assemblies that meet requirements of UL 580 for the following wind-uplift resistance:

(1) Class 90

1.4 Submittals

A. Shop Drawings: For the following metal building system components. Include plans, elevations, sections, details and attachments to other Work.

(1) For installed components indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

(2) Anchor-Bolt Plans: Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.

(3) Structural-Framing Drawings: Show complete fabrication of primary and secondary framing. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

(4) Roof and Wall Panel Layout Drawings: Show layouts of panels on support framing, details of edge conditions, joints, panel profiles, corners, custom profiles, supports, anchorages, trim, flashings, closures and special details. Distinguish between factory- and field-assembled work.

(5) Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):

a. Ventilators
b. Louvers
c. Gutters
d. Downspouts

B. Product Certificates: Signed by manufacturers of metal building systems certifying that products furnished comply with requirements.

(1) Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:

a. Name and location of Project
b. Order number
c. Name of Manufacturer
d. Name of Contractor
e. Building dimensions, including width, length, height and roof slope.
f. Indicate compliance with AISC standards for hot-rolled steel, including edition dates of each standard
g. Governing building code and year of edition
h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic zone or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.

j. Building-Use Category: Indicate category of building use and its effect on load importance factors

k. AISC Certification for Category MB: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC-Certified Manufacturer.

1.5 Warranty

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

B. Special Warranty of Panels: Written warranty, executed by manufacturer agreeing to repair or replace roof and wall panels that fail in materials or workmanship within specified warranty period.

(1) Warranty Period: Three years from date of Substantial Completion

C. Special warranty on Panel Finishes: Written warranty, signed by manufacturer agreeing to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling and loss of film integrity.

(1) Warranty Period for Roof Panels: 20 years from date of Substantial Completion

(2) Warranty Period for Wall Panels: 20 years from date of Substantial Completion

PART TWO – PRODUCTS

2.1 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Federal Steel Systems, 7505 East Harvard Avenue, Denver, CO 80231, Zach Turner, 720.475.1354 x 239

2.2 Structural Framing

(1) Primary Framing: Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

a. Slight variations in span and spacing may be acceptable if necessary to meet manufacturer's standard, as approved by Architect.

(2) Rigid Clear-Span Frames: I-shaped frame section fabricated from shop-welded, built-up steel plates or structural-steel shapes.

(3) Frame Configuration: Single shed

(4) Exterior Column Type: Tapered

(5) Rafter Type: Tapered

B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

(1) End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0747 inch (1.9 mm).

(2) End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch (1.5 mm).

C. Secondary Framing: Manufacturer's standard secondary framing members including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet pre-painted with coil-coating, unless otherwise indicated, to comply with the following:

(1) Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.

a. Depth: 8-1/2 inches (216 mm)

(2) Purlins: Steel joists of depths indicated

(3) Girts: C- or Z-shaped sections; fabricated from minimum 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 45 to 50 degrees to flange and with minimum 2-1/2-inch- (64-mm0) wide flanges)

a. Depth: 8-1/2 inches (216 mm)

(4) Eave Struts: Unequal-flange, C-shaped sections; fabricated from minimum 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for both roof and wall panels

(5) Flange and Sag Bracing: Minimum 1-5/8-by-1-5/8-inch (41-by-41-mm) structural steel angles, with a minimum thickness of 0.0598-inch- (1.5-mm-), to stiffen primary frame flanges.

(6) Base or Sill Angles: Minimum 3-2-by-0.0747-inch (76-by-51-by-1.9-mm) zinc-coated (galvanized) steel sheet.

(7) Purlin and Girt Clips: Minimum 0.0747-inch- (1.9-mm-) thick, zinc-coated (galvanized) steel sheet.

(8) Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0747-inch- (1.9-mm-) thick, zinc-coated (galvanized) steel sheet.

(9) Framing for Openings: Channel shapes: fabricated from minimum 0.0598-inch- (1.5-mm-) thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb and sill of other openings.

(10) Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

D. Bracing: Provide adjustable wind bracing as follows:

(1) Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade D; or ASTM A 529/ A 529M, Grade 50; ½ inch- (13 mm) diameter steel; threaded full length or threaded minimum of 12 inches (300 mm) at each end.

(2) Cable: ASTM A 475, ¼ inch- (6 mm) diameter, extra high strength grade, Class B zinc coated, seven- strand steel; with threaded end anchors.

(3) Angles: Fabricated from structural- steel shapes to match primary framing, of size required to withstand design loads.

(4) Rigid Portal Frames: Fabricate from shop- welded, built- up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

(5) Fixed- base Columns: Fabricate from shop- welded, built- up steel plates or structural- steel shapes to match primary framing; of size required to withstand design loads.

(6) Diaphragm Action of Panels: Design metal building to resist wind forces through diaphragm action of roof and wall panels.

(7) Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

E. Bolts: Provide shop- painted bolts unless structural- framing components are in direct contact with roof and wall panels. Provide zinc- plated bolts when structural- framing components are in direct contact with roof and wall panels.

PART THREE – EXECUTION

3.1 Examination

A. Examine substrates, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of metal building system.

(1) For the record, prepare written report, endorsed by Erector, listing conditions detrimental to performance of work.

(2) Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Clean substrates of substances, including oil, grease rolling compounds, incompatible primers, and loose mill scale that impair bond of erection materials.

B. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

3.3 Erection

A. Erect metal building system according to manufacturer's written instructions and erection drawings.

SECTION 15050

BASIC MECHANICAL MATERIALS AND METHODS

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Mechanical Division Index

15010	General Mechanical Requirements
15060	Pipe and Pipe Fittings
15250	Mechanical Systems Insulation
15350	Building Natural Gas Supply System
15401	Building Water Supply System
15405	Building Soil and Waste Systems
15800	Air Tempering System and Equipment
15902	Electrical Systems Control
15990	Testing, Adjusting and Balancing of Mechanical Systems

1.3 Codes and Permits

A. The mechanical work shall be performed in strict accordance with the applicable provisions of the IBC, International Building Code, 2009 Ed., and the IPC, International Plumbing Code, 2009 Ed., as adopted and interpreted by the State of Colorado, NFPA Regulations, current adopted edition, regarding fire protection, heating and ventilating and air conditioning systems and electrical systems. All materials and labor necessary to comply with rules, regulations and ordinances shall be provided. The Contractor shall hold and save the Architect free and harmless from liability of any nature or kind arising from the failure to comply with codes and ordinances.

B. Permits necessary for performance of the work shall be secured and paid for by the Contractor. All utility connections, extensions, meter pits and meter sets and tap fees for water, storm sewer, sanitary sewer and natural gas shall be paid for by the Contractor.

C. Contractor is hereby notified that existing water, sewer and gas lines run under the office building location. Such lines are to be removed and rerouted by Owner prior to building construction. Cost of such relocations and removal to be borne by Owner.

1.4 Operating and Maintenance Instructions

A. The Contractor shall furnish Owner complete operating and maintenance instructions covering all units of mechanical equipment herein specified.

1.5 Record Drawings

A. Contractor to produce record drawings of mechanical work in conjunction with Project record Drawings.

1.6 Qualifications

A. All mechanics shall be skilled in their respective trades.

1.7 Submittals

A. Contractor shall submit four (4) copies of submittal brochures to the Architect for review. Brochures shall be submitted within 30 days after Contract award. Complete data must be furnished showing performance, quality and dimensions. No equipment or materials to be purchased prior to receiving written notification from Architect.

B. Use of approved substitutions does not relieve the Contractor from compliance with the Contract Documents. Contractor shall bear all extra expense resulting from approved substitutions affecting adjoining or related work.

1.8 Identification of Piping

A. All exposed piping concealed above accessible ceilings and below accessible floors shall be labeled at 20 foot intervals and at access doors. Piping identification shall meet the standards of the Federal Occupation Safety Health Act.

1.9 Quality Assurance

A. Equipment and Materials: All equipment and materials shall be new and shall be the standard product of manufacturers regularly engaged in the production of plumbing, heating and ventilating equipment and shall be the manufacturer's latest design.

B. Preparation: Base final installation of materials and equipment on actual dimensions and conditions at the project site. Field measure for materials or equipment requiring exact fit.

C. Supervision: Be responsible for and coordinate the work of all trades working under Division 15.

D. Installation Procedures: Confer and cooperate with other trades and coordinate the work in proper relation with theirs.

E. Installation:

(1) Manufacturers Recommendations: Install equipment and materials in accordance with manufacturer's recommendations unless specifically indicated otherwise, or where local codes or regulations take precedence.

(2) Instructions: Require compliance with instructions in full detail, including each step in sequence.

(3) Conflicts: Should instruction conflict with Contract Documents, request clarification from Contract Administrator before proceeding.

F. Certifications: When required in individual Specification Section, submit manufacturer's certificate, in duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer.

G. Code Requirements: Comply with Life Safety, state and local code requirements and ordinances. Call for inspections required by responsible building inspection authority.

H. Applicable Building Codes and Ordinances: Including but not limited to the following:
The Uniform Building Code, latest edition adopted by the State of Colorado.
The Uniform Plumbing Code, latest edition adopted by the State of Colorado.
The Uniform Mechanical Code, latest edition adopted by the State of Colorado.
Any applicable state, local and Federal Health Codes that govern the industry or are required by the funding sources.

1.10 Sequence and Scheduling

A. Schedule: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

B. Coordination with Electrical Work: See Division 16.

1.11 System Starting

A. Coordination: Coordinate schedule for start-up of various equipment and systems.

B. Equipment or System Checkout: Verify that each piece of equipment or system has been checked for proper drive rotation, control sequence or other conditions which may cause damage.

C. Electrical Test: Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Wiring: Verify wiring components for equipment are complete and tested.

1.12 Cleaning

A. Debris: Remove debris adhering to mechanical equipment.

B. Remove: Remove paint and plaster, dirt, dust, stains, films and other foreign substances from mechanical equipment, supply air grilles and return air registers.

PART TWO – PRODUCTS

2.1 Electrical Grounding

A. The mechanical piping system may be bonded to the electrical ground bus at the electrical service equipment, but shall not under any circumstances be used as the main grounding electrode for the electrical service.

2.2 Access Doors

A. Furnish all access doors as shown on Drawings. The type of access door shall be as required by the room finish schedule. Tile and carpet at access doors shall be finished and trimmed neatly and accurately.

PART THREE – EXECUTION

3.1 Cooperation with Other Trades

A. The Contractor shall refer to other parts of these Specifications covering the work of other trades which must be carried on in conjunction with the mechanical work so that the construction operations can proceed smoothly and without delay.

3.2 Drawings

A. The mechanical drawings show the general arrangement of all piping, ductwork, equipment, etc. The Architectural and Structural Drawings shall be considered as a part of this work in so far as this information furnishes the Contractor with details relating to design and construction of the building. Architectural drawings shall take precedence over mechanical drawings.

3.3 Dimensions and Conditions

A. The Contractor shall verify the dimensions and conditions governing this work. No extra compensation shall be claimed or allowed between actual dimensions and those indicated on Drawings.

3.4 Equipment Support

A. Contractor shall provide support for equipment to the building structure.

3.5 Seismic Supports

A. Contractor shall insolate mechanical equipment from building using standard industry vibration techniques.

3.6 Piping and Ductwork through Walls

A. Contractor shall be capable of sealing pipe and duct openings to restore fire and smoke rated walls and floors to their rated integrity.

3.7 Trenching and Back-filling

A. All excavation, trenching and back-filling required for the mechanical installation shall be provided by this Contractor.

3.8 Manufacturer's Instructions

A. All equipment shall be installed in strict accordance with recommendations of the manufacturers.

3.9 Cleaning of Ducts

A. Before ceilings are installed and before ductwork are covered, it will be required to operate fans at full capacity to blowout dirt and debris from ducts.

3.10 Tests

A. Perform all tests in the presence of Architect. Notify one week in advance. After testing, adjusting and balancing work, the Contractor shall make an operational test covering all equipment furnished and installed under Division 15.

End of Section 15050

SECTION 15060

PIPE AND PIPE FITTINGS

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Scope

A. Work to be performed under this Section includes the furnishing and installation as follows:

(1) Building Water Supply System.
(2) Air Compressor lines and fittings.
(3) Building Soil and Waste systems.

PART TWO – PRODUCTS

2.1 Fittings

A. All fittings used for welded piping fittings shall be standard ANSI fittings, and shall be standard pipe thickness. Sizes as called for on Drawings and as per equipment and industry standards.

2.2 Floor Wall and Ceiling Plates

A. Where uncovered, exposed pipes pass through finished floors, walls or finished ceilings, they shall be fitted with chromium spun brass flanges. Plates shall be adequately sized to cover holes and held securely in place.

2.3 Hangers and Anchors

A. All piping shall be rigidly supported from the building by means of adjustable ring type hangers. Where pipes run side by side support on rod and angle iron trapeze hangers. Support piping as required by applicable codes.

PART THREE – EXECUTION

3.1 Piping Installation

A. Provide and erect, in a workmanlike manner, according to the best practices of the trade, all piping shown on the Drawings and required for the complete installation of these systems. The piping shown on Drawings shall be considered to be diagrammatic for clearness in indicating the general run and connections, and may or may not, in all parts, be shown in its true position.

B. Cutting or weakening of the building structure shall not be permitted.

3.2 Testing

A. Before any insulation is installed or before piping is covered or enclosed, all piping systems shall be tested and proven tight at not less than the maximum service pressure which the piping systems will be required to handle. All tests witnessed and approved by Architect.

3.3 Flushing, Draining and Cleaning

A. The Contractor shall flush out all water systems with water before placing them in operation.

End of Section 15060

SECTION 15250

MECHANICAL SYSTEMS INSULATION

PART ONE – GENERAL

1.1 Scope

A. Domestic hot water piping.

B. Ducts, including supply ducts and plenums, except those called out to be lined with acoustical lining.

PART TWO – PRODUCTS

2.1 Insulation

A. Insulation shall be as manufactured by Owens Corning, Armstrong or Johns Mansville.

B. Insulation and all materials on the interior and exterior surfaces of pipes, ducts, and equipment shall have a composite fire and smoke hazard rating not exceeding: Flame spread 25, smoke developed 50.

PART THREE – EXECUTION

3.1 Domestic Hot Water Piping

A. Domestic hot water piping shall be insulated with one (1) inch thick fiberglass one piece performed pipe insulation with all purpose fire retardant jacket. Fittings shall be finished with fitting mastic, reinforced with fiberglass fitting tape and finished to a smooth surface. Hangers shall be installed under the insulation.

3.2 Supply Ducts

A. All supply air ducts shall be insulated except pre-insulated flexible ducts and ducts with acoustical lining.

B. Supply Ductwork Outside the Building:

(1) All exterior ductwork shall be wrapped with 2” thick, 3 lb. density insulation, covered with glass cloth and water-tight. The sheet metal contractor shall then wrap the ductwork on all sides with 16 gauge galvanized sheet metal bagging. Prime and paint to match the building finish.

C. Heating Ducts: Ducts handling heated air only shall be insulated with 1 ½ lb. density R=6.0.

D. Cooling Ducts: 1 ½" thick, ¾ lb. density R=6.0.

E. Exposed Ducts: Exposed supply air ducts located in equipment rooms, except sheet metal ducts lined acoustically, shall be insulated as cooling ducts.

3.3 Acoustical Lining

A. Acoustical lining shall be 1 ½" thick, 3 lb. density for plenums of air systems. All other lining shall be 1" thick, 1 ½ lb. density.

End of Section 15250

SECTION 15350

BUILDING NATURAL GAS SUPPLY SYSTEM

PART ONE – GENERAL

1.1 Scope

A. Contractor to furnish and install a complete natural gas system as required.

B. The work included in the Contract consists of furnishing of all labor, materials, equipment, tools and services and includes the cost of all permits and costs whatsoever which may be required to completely install and place in operation the systems described herein.

C. The gas system shall be installed only by a properly licensed firm with a qualified and experienced gas piping crew.

PART TWO – PRODUCTS

2.1 Piping

A. Piping below grade and outside of building and up to six inches (6”) above finish grade shall be Schedule 40 black steel pipe, conforming to ASTM A-53 with factory (or job site) applied protective wrapping in accordance with the standards of the gas industry. (X-Tra Coat or Scotch Wrap.)

B. Piping above grade and inside of the building shall be Schedule 40 black steel pipe ASTM A-53.

2.2 Fittings

A. Below grade outside of the building and in return air spaces, two inch (2”) or larger, Schedule 40 welding type by Tube-Turns or approved equal.

B. Above grade piping 1 ½” smaller may have screwed fittings, except in return air space where all gas piping shall be welded.

2.3 Gas Cocks

A. Gas cocks shall be as manufactured by Crane Co. two inch (2") and larger: lubricated type, Rockwell Nordstrom.

PART THREE – EXECUTION

3.1 Installation of Piping

A. All piping shall be run straight without sags or traps and shall be pitched to run back to risers. A drop pocket consisting of a nipple and a cap shall be screwed into the bottom of each main riser.

B. Installation of all gas piping to comply with latest applicable edition of IPC, standards set by NFPA 54, National Fuel Gas Code.

C. No gas valve installed in the return air ceiling space.

D. Provide expansion loops throughout the system to allow for adequate horizontal and vertical expansion and contraction.

E. Unions or companion flanges shall be provided for easy removal of all equipment.

F. All gas lines exposed to weather (above roof) etc. shall be treated with two (2) coats of asphalt paint. All exposed lines inside of building shall be painted to match surroundings.

G. Piping under sidewalks: Install in protective conduit: Schedule 40 PVC pipe.

3.2 Tests

A. Gas piping shall be tested with air pressure according to IPC or as directed by State Inspector. Pressure to be 6-8 psiq or as directed by Inspector.

End of Section 15350

SECTION 15401

BUILDING WATER SUPPLY SYSTEM

PART ONE – GENERAL

1.1 Scope

A. A complete domestic cold water, hot water, and make-up water system including water heater, and associated miscellaneous items. This section is limited to the items referenced herewith within the building envelope and out to a point 5'-0" outside the building, unless noted otherwise on the drawings.

B. The work included in this Contract consists of furnishing all labor, materials, equipment, tools and services; and includes all costs of permits and all costs whatsoever which may be required to completely install and place in operation the systems herein described.

C. Equipment and Fixture Connections: The Contractor shall be responsible for rough-in and connection to equipment furnished by the Owner, by others, or as under the EQUIPMENT Sections of this Specification. This shall include any equipment requiring connection, to domestic hot or cold water systems, direct or indirect waste, or vent piping as shown on the Architectural, Plumbing, or Mechanical Drawings. The Contractor shall coordinate his rough-in work with the supplier of the equipment actually being furnished and shall conform to the service requirements of the furnished equipment. All final connections required by such equipment shall be made and tested by the Contractor. Carefully review the Architectural Drawings for all of the equipment and fixture locations.

PART TWO – PRODUCTS

2.1 Piping

A. Domestic water system piping below grade or slab on grade shall be Type "K" soft temper copper tubing.

B. Domestic water system piping above slab on grade shall be Type "L" hard drawn copper tubing.

C. Domestic water piping 4" and larger, below grade or slab on grade, shall be cement lined ductile iron piping.

D. Domestic water system piping 5" and larger inside the building above grade, shall be Schedule 40 galvanized steel conforming to ASTM A-120.

2.2 Fittings

A. Fittings for copper piping below grade with brazed joints shall be wrought copper (the same thickness as the piping) for solder joint-pressure type.

B. Fittings for copper piping above grade shall be wrought copper or cast red brass for solder joint-pressure type.

C. Fittings for galvanized steel piping shall be threaded type galvanized malleable iron.

2.3 Joints

A. Joints for copper piping systems 1 ½" and smaller shall be made using 95-5 Tin-Antimony or approved lead free solder. (No 50/50 or any lead containing solder will be permitted on domestic water piping, hot or cold.)

B. Joints for copper piping systems 2" and larger above grade slab and all sizes below grade slab shall be made using Sil-Fos, Easy Flow, or Phos Copper brazing rods with a melting temperature above 1000 deg. F.

C. Joints for galvanized threaded steel piping shall be made using Teflon tape.

2.4 Protection of Piping

A. Copper piping installed below grade or slab on grade shall be protected against corrosion as follows:

(1) 1 ½" or smaller shall be installed in polyethylene protective conduit terminated not less than 6" above finished floor slab and a minimum 36" from the building outside wall.

(2) 2" or larger shall be protected by a double wrapping of X-Tru-Coat, or Scotch Wrap, or by a double coat of bituminous paint. Termination of coating shall be the same as described for 1 ½" or smaller pipes.

2.5 Shock Absorbers

A. Furnish and install factory-sealed shock absorbers at locations shown on the Drawings and/or as outlined by Plumbing Drainage Institute Standard WH-201.

2.6 Water Heating Equipment, Pumps and Other Equipment

A. Domestic water heating equipment, pumps, and other equipment, are specified in the Plumbing Fixtures, Trim and Equipment Specifications Section 15450, or as shown on the Drawings.

2.7 Trap Primers

A. Where required by plumbing code and/or as shown on the Drawings, all infrequently used floor drains and floor sinks connected to the sanitary sewer shall be protected by trap primers. ½" copper tubes shall be run from primers to the traps of the floor drains or floor sinks. The trap primers shall be mounted in accessible locations and shall be as specified in Section 15450.

PART THREE – EXECUTION

3.1 Installation of Piping

A. All water piping shall be run free from traps and arranged so that all parts of the system can be drained. Provide accessible ¾" gate valves with hose ends where required for this purpose. Provide expansion loops or connections throughout the system to allow for adequate horizontal and vertical expansion and contraction, and for building setting at the point of water main entry into the building. All pipe size changes shall be made with reducing fittings or bell reducers or increasers where any change in the pipe size occur. No bushing of any nature shall be allowed in piping.

B. Care shall be taken to avoid mechanical ductwork, electrical equipment, and air handling equipment above ceiling. The Contractor shall be responsible for coordinating routing of piping with ceiling Contractor and sheet metal Contractor. Relocation of piping required from poor coordination by the Contractor shall be at his own expense.

C. No water piping shall be located in outside walls unless shown, and then piping is to be insulated and located as close as possible to inside of wall cavity with additional insulation between piping and exterior wall.

D. Written prior approval required for all proposed substitutions of equipment and materials, 10 days prior to bid date of project.

E. All piping (hot water) within the building, including mechanical equipment rooms, shall be painted.

F. All piping shall be concealed where possible. All exposed piping where concealment is not possible, or in equipment room, shall be painted.

G. All trenching and backfill for piping shall be the responsibility of the Contractor.

H. Any changes to the plans shall be approved by the Architect. Contractor shall submit in writing any proposed changes for approval and receive approval prior to making such changes.

I. All pipe through footings below floor slab shall have cast iron soil pipe sleeve (minimum two pipe sizes or larger) which extends full width of footings.

3.2 Valve Control

A. Control valves shall be installed where shown on plans and/or as directed, wherever necessary for controlling the several sections of the domestic water system. All valves shall have adjacent unions (except on copper piping.) Access shall be provided to all concealed valves by means of access doors furnished by the Contractor and installed by the Contractor. The Contractor shall coordinate the location of valves with architectural features of the building in order that the access doors will be located symmetrically with the other features.

B. The hot and cold water supply lines to each and every fixture specified on the Drawings shall be equipped with approved stop valves, which shall be chromium-plated where exposed chrome-plated pipe is used.

3.3 Relief Valves

A. All pressure vessels shall be equipped with ASME rated and labeled valves as manufactured by Keckley, or Bell and Gossett. Size for proper flow and pressure as directed by equipment manufacturing data or by the Architect. Extend discharge lines to nearest floor sink, or to outside, or as directed at the job site by the Architect.

3.4 Unions and Flanges

A. Unions and flange shall be installed at all points necessary to permit easy removal of valves and equipment without injury to other parts of the system. Unions in screwed piping shall be Grinnell Fig. 459. Unions in copper piping shall be Grinnell Fig. 9102 in wrought copper, Fig. 9730 in cast brass. Fabricate flanged headers to make it possible to remove tube bundles, or similar items, without having to disconnect any major portions of piping.

B. All hose bibbs and hydrants shall have a vacuum breaker on the outlet.

3.5 Access Doors

A. All concealed valves, controls, etc., shall be provided with access doors.

3.6 Backflow Protection

A. Protection: All plumbing fixtures, faucets with hose connections, and all other equipment having plumbing connections shall have their water supplies protected against back-siphonage, as shown on the Drawings, or as required by the Plumbing Code or local health authorities.

B. Testing: Arrange for testing backflow devices as required by the local health authorities and the Architect.

3.7 Tests

A. Tests: All water piping, hot and cold, shall be made tight under a hydrostatic test pressure of 150 psi and maintained without pressure loss and visible leakage for a minimum of four (4) hours. No caulking to joints will be permitted. Any joint found to leak under this test shall be broken, remade, and a new test applied. Certify to the Architect that the tests have been completed.

3.8 Sterilization

A. On the building side of the water supply piping, provide a ¾" connection through which chlorine shall be introduced into the building water piping system to sterilize those systems thoroughly.

B. After completion of testing, the entire cold and hot water piping systems, with attached equipment, shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine, or calcium hypochlorite or chlorinated lime, and shall be pumped into the system through the connection described above. The sterilization solution shall be allowed to remain in the system for a period of twenty-four (24) hours during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chlorine content is not greater than 0.2 parts per million.

C. The sterilization process shall be conducted as described by the State of Colorado, Department of Public Health, and upon completion of the process, the Contractor shall test and certify the cleanliness of the water piping system. The Contractor shall pay all costs and charges incidental to this test.

End of Section 15401

SECTION 15405

BUILDING SOIL AND WASTE SYSTEM

PART ONE – GENERAL

1.1 Scope

A. The building sanitary drainage system limited to a point 5'0" outside of the building (unless noted otherwise) shall be installed, as shown on the Plans, complete with all fixtures, drains, traps and required connections. All fixtures and drains shall be properly trapped and vented as required by the applicable plumbing code.

B. The work included in this Contract consists of furnishing all labor, materials, equipment, tools and services, and includes all costs of permits and all costs whatsoever which may be required to completely install and place in operation the systems herein described.

C. Equipment and Fixture Connections: The Contractor shall be responsible for rough-in and connection to equipment furnished by the Owner, by others, or as under Plumbing Fixtures, Trim and Equipment Section 15450 of this Specifications. This shall include any equipment requiring connection to domestic hot or cold water systems, direct or indirect waste, or vent piping as shown on the Architectural Plumbing or Mechanical Drawings. The Contractor shall coordinate his rough-in work with the Supplier of the equipment actually being furnished and shall conform to the service requirements of the furnished equipment. All final connections required by such equipment shall be made and tested by the Contractor. Carefully review the Architectural Drawings for all of the equipment and fixture locations.

PART TWO – PRODUCTS

2.1 Piping

A. Sanitary Waste Piping: Soil, waste, and vent piping below slab on grade shall be Schedule 40 PVC.

B. Soil, waste, and vent piping above slab shall be Schedule 40 PVC.

2.2 Equipment Drains

A. The Contractor shall extend drain lines from all equipment requiring drainage, relief valves, reduced pressure backflow preventers, and drain pans to the nearest floor drain or floor sink, or as shown on the Drawings, or as directed by the Architect.

B. Relief valve drain lines shall be equal in size to the valve outlet port and shall be sloped away from the relief valve.

C. Equipment drain lines shall be either Schedule 40 galvanized steel pipe with galvanized malleable iron fittings or Type "M" copper tubing with solder fittings. (Equipment drain lines from pure and ultra pure applications shall be Schedule 40 pressure polypropylene with mechanical type joints.)

PART THREE – EXECUTION

3.1 Installation of Piping

A. The Contractor shall promptly install sewer, drains, and piping after excavating, chasing or cutting for same as has been done, so as to keep the openings for such piping open as short a time as possible. No piping shall, however, be permanently closed up, furred in, or covered before the testing and examination of same by the authorities having jurisdiction.

B. All piping shall be run in the most direct manner. Horizontal pipe shall have a grade of one-quarter ¼" per foot wherever possible and not less, in any case, than one-eighth 1/8" per foot. 1/8" per foot allowable only for pipes 4" in diameter and larger. All offsets shall be 45 deg. or less.

C. Cleanouts shall be provided at:

(1) The bottom of each soil or waste stack;

(2) On horizontal drain lines below grade longer than 5';

(3) On each kitchen sink and urinal;

(4) On horizontal vent lines if rising at an angle less than 45 degrees from the horizontal up to a point at least 6" above the floor rim of the fixture served by the vent;

(5) At each change of direction greater than 90 degrees;

(6) On interior horizontal runs below grade at intervals not exceeding 75';

(7) On exterior horizontal runs at intervals not exceeding 100'; and/or

(8) As shown on the Drawings and as required by the Plumbing Code in addition to these Specifications.

D. Two-way cleanouts outside of the building shall be installed as shown on the Drawings, or as a substitution for an upper terminal cleanout.

E. All interior cleanouts shall be the same size as the pipe served up to 4" size and 4" for all larger lines. Exterior cleanouts shall consist of a concrete encased wye in the line with sewer piping extending upward there from and terminating in a concrete slab at grade. A cleanout casting as specified shall be set on this slab in such a manner as to be flush with the finished grade. All exterior cleanouts shall be the same size as the sewer up to 6" size and shall be 6" for all larger lines. See Cleanout details and Specifications.

F. Fixture vent piping shall be kept above the fixtures in such a manner as to preclude the use of the vents as waste, if the waste pipes later become obstructed. All vent pipes shall be properly graded without drops or sags, and so connected as to drip back to waste pipes by gravity. Whenever practical, or as shown on the Drawings, two or more vents shall be connected together at a point not less than 6" above flood rim of fixtures served by the vent, and extended as one vent through the roof. Vent piping installed below grade slab shall be not less than 2" diameter.

3.2 Flashings

A. Flash vent piping through roof (V.T.R.) with lead flashing, weight of not less than 4 pounds per square foot, extending at least 14" in all directions under roofing and 12" up around the vent pipe. Cap flash pipe and turn down inside 1" approximately. Install all vent pipes extending through roof prior to roof installation. Flashing shall be two-piece type, base, and cap flashing. Prior to the roofing installation, furnish base flashing pieces to the Contractor for installation by the Contractor. The Contractor shall install cap flashing.

B. Stoneman two-piece or vinyl V.T.R. flashing is permissible as an option to two-piece lead flashing. The vinyl flashing shall be 20 mil thickness, ASTM C689-62 tear strength, 0.14 lb./ft. equal to Pasco Manufacturing Co., 777 Standford Dr., Los Angeles, California 90021. The flashing shall be installed in accordance with the manufacturer's recommendations.

C. Floor drains and floor sinks (which are specified with a flashing clamp) and all job-site built shower pans shall be flashed with 0.40" thick non-plasticized chlorinated polyethylene sheet, Chloraloy 240, as manufactured by Noble Company, or approved equal. Each floor drain and floor sink flashing shall be minimum 36" x 36" square and shall be terminated (if applicable, in corners and against walls) not less than 6" above finish floor.

D. Lead flashing of floor drains, floor sinks, and shower pans will not be permitted.

3.3 Floor Drain and Floor Sinks

A. Floor drains and sinks shall be as manufactured by Smith, Wade, Josam or Zurn. Provide flashing clamp devices and flashing where required by floor construction and where specified.

B. See Plumbing Equipment Specifications Section 15450 for types. All floor drains and sinks shall be installed with grates square with building lines.

3.4 Tests

A. The entire sanitary waste and vent system shall be tested by filling the entire system or in sections (if required by sequence of construction), with water to provide a minimum of 10 ft. head of water on each system joint and pipe. System shall remain filled with no loss of water and visible leakage for a minimum of four (4) hours. Preliminary testing shall be accomplished as necessary prior to final test.

B. The Contractor shall certify in writing that all tests were satisfactorily completed before piping was concealed, and shall submit the certification to the Architect for his records, and for transmittal to the Owner.

End of Section 15405

SECTION 15800

AIR-TEMPERING SYSTEM

PART 1 – GENERAL

1.1 Requirements

A. Conform with applicable provisions of the General Conditions, the Special Conditions and General Requirements.

B. See Section 15010, 15060, 15900 for general mechanical requirements and related work.

1.2 Work Specified Elsewhere

A. Controls are specified under Section 15900.

B. Insulation and Acoustical Treatment are specified under Section 15250.

C. Painting of equipment is covered under "Painting" in these specifications.

D. Electrical Work as noted in Section 15010, "General Mechanical Requirements."

E. Duct Chases, Wall Openings and Equipment Foundations by General Contractor.

1.3 Scope

A. Furnish and install air conditioning units, make up air units(s), unit heaters fans, filters, sheet metal work, grilles, louvers, diffusers and registers, sound traps, fire dampers and sleeves, accessories and incidentals.

B. All control dampers furnished under Section 15900 will be installed under this section. After dampers are set they shall be balanced and adjusted for free and easy operation.

1.4 Sound Levels

Sound levels attributable to mechanical equipment such as terminal units, fan-coil units, centrifugal fans, etc. are designed to result in sound levels of NC 40 for offices, conference rooms, and NC 35 for library, classroom, bedrooms, etc. measured within the rooms. Mechanical equipment that has been substituted for the specified equipment shall perform within these sound limitations, or will be replaced or adjusted as required. Sound levels attributable to duct vibration that result in noticeable noise or vibration to duct hangers, lighting fixtures, ceiling tees or diffusers shall be re-supported or adjusted until the disturbing noise is brought within acceptable limits.

1.5 Dimensions

A. The Contractor shall check all drawings furnished upon their receipt and shall promptly notify the Architect of any discrepancies. The Contractor shall compare all drawings and verify all dimensions both on the drawings and in the field before laying-out, cutting, and fabricating the work. Sheet metal work that is cut and fabricated from the Contract Drawings without dimensional verification will be at the risk of the Contractor.

PART TWO – PRODUCTS

2.1 Equipment Schedules

A. All major items of equipment are specified in the Equipment Schedules on the Drawings and shall be furnished complete with all accessories normally supplied with the catalog item listed and all other accessories necessary for a complete and satisfactory operating system.

2.2 Ductwork

A. Materials: Construct all ducts, casings, plenums, etc. from galvanized steel sheets. Sheets shall be free of blisters, slivers, pits, and imperfectly galvanized spots. Reinforcing angles and bars, and duct support materials shall be galvanized steel.

Low Velocity Duct Construction and Gauges: Construct low velocity supply and exhaust ducts using Pittsburgh, or Acme Lock Button Punch Snaplock corner seams. Duct Mate, TDC or approved equal joints are acceptable. Low velocity duct construction is for low pressure supply, return, and exhaust systems where velocities do not exceed 1,800 feet per minute and total pressures do not exceed –1.0" to +2.0" water gauge. Duct construction and gauges for galvanized steel ductwork shall be as recommended in the Sheet Metal and Air Conditioning Contractors National Association, Low Velocity System Duct Manual, Table 1, Latest Edition, for galvanized ductwork. In addition to the transverse of connection cross joints detailed, all joints shall be sealed airtight with Benjamin Foster 32-14 or 32-15 sealant and then wrapped with one layer of glassfab reinforcing tape set in a coating of this sealant. "Hardcast" sealing system is also acceptable. Tape and sealant shall not exceed a flame spread of 25 or a smoke development of 150. Round light gauge snap lock seam duct and fittings are not acceptable, but shall be spiral lock seam duct and fittings as specified for high pressure duct.

2.3 Special Ductwork

A. Grease Laden Ductwork: Any grease laden exhaust ductwork to include food service exhaust ductwork, shall conform to the provision of NFPA No. 96. Ducts shall be constructed of and supported by 16 gauge black steel with all seams and joints having a liquid tight continuous external weld. Ducts should lead as directly as possible to the exterior of the building and shall be installed without forming dips or traps which might collect residue. Exhaust ductwork shall contain access openings at each change in direction of the duct and every 20 ft. in straight ductwork for purposes of inspection and cleaning. Openings shall be at the sides and large enough to permit cleaning with the lower edge of the opening not less than 1 ½ inches from the bottom of the duct. Access covers shall be constructed of 14 gauge (black steel) and shall be grease-tight when in place.

B. Exterior Ductwork: Exterior ductwork exposed to the weather shall first be insulated with 2" thick, 3 lb. density insulation which is then covered with glass cloth and sealed water tight. Ductwork located above the roof is to be supported as detailed on the Drawings with support sized to accommodate the 2" thick insulation. The Sheet Metal Contractor shall then enclose the exposed top and sides of ductwork with 28 ga. galvanized steel or equivalent gauge aluminum sheeting ductwork to protect the insulation and to provide a sleeve through roof curbs which can be flashed to be made water tight. Any damage to the glass cloth and Sealfas coating shall be repaired reapplying a Sealfas coating to the affected joints and seams.

2.4 Flexible Ducts

A. Flexible ducts shall maintain dimensional integrity and shall be designed for the duct pressures encountered. Flexible ducts shall be insulated similar to, and with the same heat transfer coefficients, as the connected ductwork. Flexible ductwork shall not exceed a flame spread rating of 25 or a smoke development rating of 150. Flexible ducts shall not exceed 5 ft. in length. Flexible ducts for connections at diffusers or other low pressure applications shall be equal to Genflex SLR-181. Connections to rectangular ducts may be by spin-in fittings and hand dampers. Spin-ins must be tapered type and inlet area 1.5 times outlet area.

2.5 Fire Dampers

A. Fire dampers to be provided as required by code to maintain one (1) hour fire rating. At the locations shown on the Drawings, provide fire dampers. Provide access doors at all fire damper locations of sufficient size to allow easy inspection and resetting of fire damper linkages. Fire damper links shall be of the test strength recommended to prevent nuisance closing. All fire dampers shall conform to the requirements of NFPA Pamphlet 90A, and shall bear the Underwriter's Label. All fire dampers shall be furnished with factory installed sleeves. Fire dampers shall be installed inside the fire walls and supported as required by UBC, NFPA 90A and UL 555.

B. Rectangular Fire Dampers: Fire dampers for rectangular ductwork shall be of the folding blade type with the hinged blades completely out of the air stream or of the single hinged blade type. Fusible links shall be accessible from either side of the damper. Each damper shall be furnished with a factory installed and U.L. approved galvanized welded steel sleeve and closure compartment to house the folded blades as allowed by UL 555.

2.6 Smoke Dampers

A. Smoke dampers shall be installed in walls designed as smoke partitions. Dampers shall be tight closing interconnected multi-blade type with shaft extension for external operation by pneumatic or electric motor. Smoke dampers shall be located as near as possible to the smoke wall and always within ductwork before any cross duct joints.

B. Fire/Smoke Dampers: Where both fire and smoke dampers are required in the same wall, the Contractor may furnish and install combination fire and smoke dampers where shown on the Drawings and at every duct and return air penetration of walls so designated as fire and smoke walls. Combination fire and smoke dampers shall be 1 ½ hour UL labeled fire damper with fusible link and with auxiliary operating shaft permitting operation of damper by standard electric or pneumatic damper operators. Operation of unit shall be such that if fusible link melts, the damper is disconnected from auxiliary shaft and damper closes and latches and functions as a fire damper. Operation of the unit as a smoke damper is such that upon detection of smoke by the Building Fire Detection System, designated smoke dampers are automatically closed by de-energizing electric or pneumatic damper motors. Damper operator and frame shall be furnished and installed under Section 15900, Controls and Instrumentation, and shall be mounted outside the ducts. Dampers shall have frames constructed of 16 ga. steel blades 6" wide and 6" on centers with closure spring, stainless steel bearings.

2.7 Access Doors

A. Wall, ceiling and duct access doors at fire dampers shall be Controlair 16 ga. access door with continuous hinge, gasket and thumb screw locks. Baked aluminum enamel finish on access door on finished surfaces. Size of fire damper access doors in low velocity ductwork shall be 2" less than the width of the duct by 12", up to a maximum size of 12" x 24". Access doors on insulated ductwork shall be installed on an extended metal collar flush with the insulation.

B. Units shall have gaskets and close airtight. Metal doors in ducts lined with acoustical insulation shall be lined with the same thickness of acoustical insulation as the duct.

2.8 Acoustical Lining

A. The acoustical lining shall be as specified in Section 15250, Mechanical Systems Insulation. The acoustic sheets shall be installed to completely line the plenum walls and roof. After acoustic sheets have been installed, all joints shall be pointed up to a smooth surface with asbestos cement or asphalt emulsion. Plenum lining shall be 1 ½" thick rigid liner similarly impaled on weld studs.

2.9 Louvers

A. Louvers shall be storm proof design constructed of 0.081" extruded aluminum. Extruded blades shall be inclined at least 25 degrees from the horizontal. Slats over 48" long shall have internal intermediate supports. The exterior face of the louver shall have a flange all around, neatly fitted to the building wall, flashed at top and caulked at sides and bottom. Net open area for air passage shall be a minimum of 50% of the nominal size. On the inside face of each louver, install a removable screen, consisting of ½" mesh galvanized wire screen in a galvanized channel frame. Refer to the Architectural and Mechanical Drawings for louver requirements. Stationary louver pressure drop shall not exceed 0.2", and shall carry less than 0.3 ounces of water per square foot when tested in accordance with AMCA Standard 500. American Warming and Ventilating Model LW-P-3131 ES.

B. Contractor must coordinate louver size and construction with Structural and Architectural openings to assure proper fit.

2.10 Filters

A. Filters shall be as listed in the schedule on the Drawings. Furnish one set of temporary filters to protect the equipment until Testing and Balancing commences or until the Owner takes beneficial occupancy. Provide one spare set of filters for each replaceable filter furnished.

2.11 Turning Vanes

A. Turning vanes shall be installed in all square elbows in low velocity supply and exhaust ductwork. Turning vanes shall be high efficiency profile type with single surfaced air-foil bladed shapes equal to Aero/Dyne Co., Airsan, Elgen, or approved equal.

B. Furnish airfoil shaped acoustical turning vanes designed to reduce the dynamic air losses as well as the noise level. Turning vanes shall be non-corrosive and shall have fiberglass fill with open protective metal facing. Furnish galvanized steel mounting rails with pre-punched locating holes on 3 ½" centers designed to receive the turning vanes the full width or height of the duct. All square elbows shown on the supply ducts on the Drawings shall incorporate acoustical filled turning vanes.

PART THREE – EXECUTION

3.1 Installation of Sheet Metal Work

A. General: All necessary allowance and provisions shall be made in the installation of sheet metal ducts for the structural conditions of the building, and ducts shall be transformed or divided as may be required at no change in contract price. Whenever this is necessary, the required area shall be maintained. All of these changes, however, must be approved and installed as directed at project. During the installation the open ends of ducts shall be protected to prevent debris and dirt from entering.

B. Whenever exposed ducts pass through walls, floors, or ceilings, a flanged sheet metal collar fitting close around ducts shall be slipped along duct until flange is tight against finished surface covering edges of openings and presenting a neat appearance. Collar shall be locked to duct.

C. Ductwork is frequently routed through bar joists and between bar joists. Contractor shall coordinate duct locations with joist submittals prior to fabrication.

3.2 Cleaning

A. All ducts, coils, housing, registers, grilles, fans, etc., shall be clean when installed and shall be kept clean until the system is completed. As the various parts of the system are installed, they shall be wiped or blown clean and openings taped dust-tight with heavy paper or cardboard until the system is completed and ready for testing. At that time all covers and protective wrappings shall be removed. Where one has been torn or previously removed, the duct, coil, register, etc., shall be carefully cleaned of any dirt or dust that has entered the opening.

3.3 Duct Penetrations

A. Where ducts are shown connecting to masonry openings and along edges of all plenums at floors and walls, provide a continuous 2" x 2" x 1/8" galvanized angle iron which shall be bolted to the construction and made airtight to the same by applying caulking compound. Sheet metal in these locations shall be bolted to the angle iron. Seal fire and/or smoke wall and all floor penetrations with Dow Corning, or equal, 3-6548 Silicone RTV foam.

3.4 Flexible Connections

A. Provide flexible connections, not less than 4" wide, constructed of heavy waterproof woven plastic coated glass fabric at locations indicated on the Drawings and at the inlet and outlet connection at each fan unit where directly connected to duct system. Flexible connections shall be securely fastened to the equipment and to the ductwork by a galvanized iron band, provided with tightening screws. Fabric for flexible connections used in special exhaust systems shall be compatible for service. Provide steel spring vibration isolators spanning across flexible connections of isolated fan housings to prevent blow-apart horizontal displacement of fan housings. Flexible connections exposed to the ultra violet rays of the sun shall be equal to Ventlon as manufactured by Ventfabrics, Inc.

3.5 Splitter Dampers

A. Install hand operated volume and splitter dampers at locations and of sizes shown and/or as required for proper balancing. Volume dampers shall be controlled by heavy duty locking quadrants mounted on the outside of the duct. Where ducts are insulated, the damper rod shall be extended and the operator shall be mounted on the outside of the insulation. Splitter dampers shall be at least 1 ½ times as long as the narrowest adjacent split. All damper fittings must be heavy commercial items and must be approved the Architect before installation.

B. Splitter dampers above fixed finished ceilings shall be operated by Young Regulators No. 912 or 914 controllers with adjustment accessible at the face of finished ceiling.

3.6 Supporting Dampers

A. Dampers shall be supported by properly reinforcing the ductwork or sheet metal walls at the damper locations to carry the weight of the dampers and the force exerted on the dampers due to air pressure, or shall be supported independent of ductwork from the ceiling or floor, as conditions at the site determine. Damper frames shall be bolted – not welded – to prevent frame distortion.

3.7 Cross Breaking

A. Low velocity rectangular sheet metal ducts shall be cross broken on the four sides of each 4 foot panel. All vertical and horizontal sheet metal barriers, duct offsets, elbows, as well as 4 foot panels of straight sections of ducts shall be cross broken. Cross breaking shall be applied to the sheet metal between the standing seams or reinforcing angles; the center of cross break shall be of the required height to assure surfaces being rigid.

B. High velocity plenum panels shall not be cross broken.

3.8 Test Holes in Ductwork

A. Furnish test holes in ducts at locations required by the Testing ad Balancing Team for testing of air quantities in ducts. Ventlok No. 699 or approved equal closures shall be provided and installed for each test hole, with sufficient neck length to penetrate the insulation.

3.9 Hangers and Supports (Low Velocity Rectangular)

A. It is essential that all ducts shall be rigidly supported. Hangers for low velocity ducts up to 18" in width shall be placed on not more than 10 foot centers. Low velocity ducts 19" through 35" shall be supported on not more than 8 foot centers. Ducts 36" in width and greater shall be supported on not more than 5 foot centers. Where vertical ducts pass through floors or roofs, heavy supporting angels shall be attached to ducts, and to structure. Angles shall be of sufficient size to support the ductwork rigidly and shall be placed on at least two sides of the duct.

B. Construct hangers for rectangular ductwork from galvanized steel 1" x 16 gauge. Hangers shall extend down the sides of rectangular ducts the full depth of the duct and shall be bent underneath the duct 2". Hangers shall be secured to the duct using sheet metal screws or rivets of appropriate sizes on 6 inch centers, but not less than two screws in the side and one on the bottom of each hanger. For rectangular ducts 36" and greater in width construct hangers from galvanized steel 1 ½" x 16 gauge.

3.10 Hangers and Support (Round)

A. Hangers for ducts up to 18" diameter shall be placed on not more than 10-foot centers. Ducts 19" and over in diameter shall be supported on not more than 5-foot centers. Hangers shall be placed plumb and present a neat appearance. Construct hangers for terminal units and for ductwork from galvanized steel 1" x 16 gauge for ducts up to 36" diameter. For ducts over 36" diameter, support ducts

with 1 ¼" x 1 ¼" x 1/8" angles. The use of perforated band iron for duct support is prohibited. Hangers shall extend down the sides of the ducts using not less than three rivets or parker screws of appropriate sizes. It is essential that all ducts be rigidly supported. Where vertical ducts pass through floors or roofs, heavy supporting angles shall be attached to ducts and to the structure. Angles shall be of sufficient size to support the ductwork rigidly. Place supporting angels on at least two sides of the duct.

3.11 Testing

A. The complete air tempering system will be tested and balanced as specified in Section 15990. If any equipment fails to produce the specified conditions due to installation, performance, or workmanship, the Contractor shall make any necessary changes to satisfy the specified conditions.

B. Cleaning of Ducts and Testing for Tightness: Before the ceiling is installed and final connections are made to the terminal units, it will be required that the fans be operated at full capacity to blow out dirt and debris from ducts. If it is not practical to use the main supply blower for this test, the ducts may be blown out in sections by a portable fan. After the ducts have been cleaned, the final connections shall be made to the terminal units.

C. An air tightness test shall be made on all high velocity ductwork. A minimum pressure of 6" water will be obtained for satisfactory test. A soap test shall be applied to all sheet metal connections and joints to locate air leaks. Air leaks which are in excess of that required to bubble the soap suds (that is – actually blow the suds sway) shall be sealed by additional taping and caulking to reduce the leakage to a rate not to exceed slow bubbles forming. In lieu of the above tightness tests, the Contractor may test the ducts by attaching a fan with a capacity of not over 300 cfm to the ductwork and with the dampers in the terminal units closed, build up the pressure in the ducts to 6" water. If this pressure cannot be obtained, the Contractor shall locate and repair the leaks as specified above.

D. Operating Test and Report: The Contractor shall have all of his equipment operating for a test period of not less than 24 hours, and check and adjust all of his equipment. During this operating period he shall instruct the Owner's operating personnel in the operation and maintenance of the system. A written report shall be made in quadruplicate with the following data, which shall be conducted on the complete systems as furnished under this section and the Heating and Cooling Piping and Equipment Section of theses Specifications.

(1) Running amps and voltage of all motors together with the nameplate rating.

(2) Pressure at suction and discharge of all fans.

(3) Pressure drop across each hearing and cooling coil.

(4) Air temperature entering and leaving each heating and cooling coil.

(5) Pressure drop across each bank of filters.

End of Section 15800

SECTION 15990

TESTING, ADJUSTING AND BALANCING OF MECHANICAL SYSTEMS

PART ONE – GENERAL

1.1 Requirements

A. The testing, adjusting and balancing of the mechanical systems shall be performed by an independent testing and balance (TBA) agency approved by the Architect.

B The Testing and Balance Agency shall have the necessary experience, personnel, and equipment to accomplish the required balancing. TAB Agency shall submit a list of similar project experience. This list shall include a general description of the mechanical systems and the names and addresses of the Building Owners and Mechanical Engineers/Architects who designed the buildings.

C. The testing, adjusting and balancing of the mechanical systems for the building shall be executed by the TAB Agency as described below and shall be paid for by the Contractor and included in the contract price.

PART TWO – PRODUCTS

2.1 Equipment

A. The Testing and Balance Agency shall provide not less than the following instruments and equipment for testing and balancing purposes.

(1) Pitot tubes and draft gauges.

(2) Capture boxes, calibrated

(3) Velometer, calibrated

(4) Thermometers, mercury and bi-metallic stem types

(5) Ampere – voltmeter

(6) Speed Indicator

(7) Calibrated Water Flowmeter

PART THREE – EXECUTION

3.1 General

A. Upon completion of the air conditioning system, the TAB Agency shall perform the below specified tests, compile the test data and submit four (4) copies of the complete test data to the Architect.

3.2 Air Handling Equipment

A. Place all systems in operation with all filters installed and automatic control systems completed and operating. Temporarily load air filters by partially blanking or other approved means to produce air pressure drop midway between the clean and dirty conditions.

3.3 Air Distribution System

A. Test, adjust and balance systems as specified herein to provide design ratings:

B. Test and adjust blower rpm to design requirements.

C. Test and record motor full load amperes.

D. Make Pitot tube traverse of main supply, return and exhaust ducts and obtain design CFMat fans to within 5% of specified quantities.

E. Test and record system static pressures, suction and discharge.

F. Test and record entering air temperature. (D.B. heating and cooling; W.B. cooling).

G. Adjust all main supply, return, and exhaust air ducts to proper design CFM.

H. Adjust all zones to proper design CFM, supply and return or exhaust.

I. Test and adjust each diffuser, grille, and register and air terminal unit to within 10% of design requirements.

J. Each grille, diffuser and register and air terminal unit shall be identified as to location and area.

K. Size, type, and manufacturer of diffusers, grilles, registers, air terminal units, and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations.

L. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.

M. In cooperation with the control manufacturer's representative, setting adjustments of automatically operated dampers to operate as specified, indicated, and/or noted. Testing team shall check all controls for proper calibrations and list all controls requiring adjustment by control installers. All tight closing dampers shall be tested for leakage.

N. All diffusers, grilles, and registers shall be adjusted to minimize drafts in all areas.

O. As part of the work of this contract, make any changes in the pulleys, belts and dampers or the addition of manual balancing dampers required for correct balance at no additional cost to the Owner.

3.4 Report

A. Upon completion of tests, all information shall be included in complete test and balance reports. The final report shall be included in the operating manuals prepared by the Contractor.

End of Section 15990

DIVISION SIXTEEN – ELECTRICAL

SECTION 16010

GENERAL ELECTRICAL PROVISIONS

PART 1 – GENERAL

1.1 Related Documents and Scope:

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

C. Accessory wiring for future emergency generator use is shown in some rooms on Drawings.

1.2 Electrical Specification Index:

16010	General Electrical Provisions
16110	Raceways, Box and Fittings
16120	Conductors
16134	Panelboards
16140	Wiring Devices and Plates
16740	Telephone and Data System

1.3 Requirements

A. Furnish all labor, materials, service, equipment and appliances required to complete the installation of the complete electrical system in accordance with the specifications and contract Drawings. The Contractor shall carefully review the Electrical, Architectural and Mechanical Drawings and specifications to determine the full extent of the electrical work required and include the cost thereof in his bid.

1.4 Requirements of Regulatory Agencies ad Standards

A. Regulatory Agencies: Installation, materials, equipment and workmanship shall conform to the applicable provisions of the National Electrical Code (NEC) and the National Electrical Safety Code (NESC). All modifications required by these codes, rules, regulations and authorities shall be made by the Contractor without additional charge to the Owner.

B. Underwriter's Laboratories (UL): All materials, appliances, equipment or devices shall conform to the applicable standards of Underwriter's Laboratories, Inc. The label of, or listing by, UL is required.

C. Workmanship and installation shall comply with the National Electrical Contractors Association (NECA) "National Electrical Installation Standards."

PART TWO – PRODUCTS

2.1 Equipment Requirements

A. The electrical requirements for equipment specified or indicated on Drawings are based on information available at the time of design. If equipment furnished for installation has electrical requirements other than indicated on Electrical Drawings, the Contractor shall make all adjustments to wire and conduit size, controls, over-current protection and installation as required to accommodate the equipment supplied, without additional charge to the Owner.

PART THREE – EXECUTION

3.1 General

A. Fabrication, erection and installation of the complete electrical system shall be done in a first class workmanlike manner by qualified personnel experienced in such work and shall proceed in an orderly manner so as not to hold up the progress of the project. The Contractor shall check all areas and surfaces where equipment material is to be installed, removed or relocated and report any unsatisfactory conditions before starting work. Commencement of work signifies this Contractor's acceptance of existing conditions. In the acceptance or rejection of the finished installation, no allowance will be made for lack of skill on the part of workmen.

3.2 Temporary Power and Lighting

A. Furnish and install all temporary electrical facilities required for construction and safety operations. No part of the permanent electrical systems or the existing electrical system may be used for temporary service unless approved by the Architect. Refer to Section 01500 of Division 1.

3.3 Performance Tests

A. Thoroughly test all fixtures, services and all circuits for proper operating condition and freedom from grounds and short circuits before acceptance is requested. All equipment, appliances and devices shall be operated under load conditions.

B. After the interior wiring system installation is complete and at such time as the Architect may direct, conduct operating tests for approval. When requested, test all thee wire, cable, devices and equipment after installation, to assure that all material continues to possess all the original characteristics as required by governing codes and standards listed in these specifications.

C. After occupancy of the building has taken place and nominal building power loads established, make voltage readings at all panelboards. Based on these readings, request final adjustments of tap changers on the service transformer from the power company.

D. Perform such other tests as required by other sections of these Specifications or as requested to prove acceptability.

E. Furnish all instruments and labor for testing.

3.4 As-Builts

A. Keep a separate set of electrical drawings at the job site at all times to be used for "as-built" drawings. This set shall be accurately kept up-to-date with all changes and/or additions in the construction and/or electrical system.

B. Upon completion of the installation, transfer all recorded information onto a clean set of blueline prints of the original Drawings. This set shall be turned over to the Architect at the final inspection. Upon turnover of the as-built drawings, the Architect will review the "as-built" work with the Contractor. If the "as-built" work is not complete, the Contractor will be so advised and requested to complete the work as required herein until it has been accepted.

C. The work to be performed shall include the following:

(1) Annotate the as-built electrical drawings to identify the actual conduit runs and associated wiring to all equipment. "RED" pencil shall be used to indicate additions and "GREEN" pencil shall be used to indicate deletions. "YELLOW" shall be used to indicate no change required.

(2) The annotated set of as-built electrical drawings shall indicate the number of conductors or cables in a conduit and whether it is a ground, neutral, hot or switch leg, or special type of cable. It shall also indicate to what circuit the receptacles, light fixtures, switches, motors, etc. and other equipment are connected.

(3) All electrical devices shall be indicated on the drawings; no "typical" drawings will be accepted.

(4) All devices shall be identified on the drawings and shall be the same as the unique identification/labeling in the field. The exact location of each electrical device shall also be shown on the drawings.

(5) All set points of each electrical device, such as differential ranges, high-low limits and sensitivities shall be indicated on the drawings.

3.5 Operating Instructions and Manuals

A. Instructions: Without additional charge to the Owner, furnish competent instruction to the Owner in the care, adjustment and operation of all parts of the electrical equipment and systems.

B. Manuals: Upon completion of the work, prepare and deliver to the Owner complete operating and maintenance manuals for the following systems and major equipment installed:

(1) Panelboards

(2) Protective Devices

a. Circuit Breakers
b. Fused Switches
c. Surge Suppression System

(3) Special Systems

a. Fire Alarm and Detection

(4) Light Fixtures

a. Luminaires
b. Ballasts
c. Lamps (include re-lamping schedules and instructions)
d. Emergency lighting units

Include catalog data, approved version of shop drawings, manufacturer's installation instructions, wiring diagrams, performance curves and rating data, spare parts lists and manufacturer's operating and maintenance instructions.

C. Other: The above requirements are in addition to specific instructions and manuals specified for individual systems or equipment.

3.6 Drawings

A. General: The electrical drawings show the general arrangement of all conduit, equipment, etc and shall be followed as closely as actual building construction and the work of other trades will permit. The architectural and structural drawings shall be considered as part of the work insofar as these drawings furnish the Contractor with information relating to the design and construction of the building. Architectural drawings shall take precedence over electrical drawings. Because of the small scale of the electrical drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such fittings, elbow, pullboxes, and accessories as may be required to meet such conditions.

B. Field Measurements: The Contractor shall verify the dimensions governing the electrical work in the building. No extra compensation shall be claimed or allowed on account of differences between actual dimensions and those indicated on the drawings.

3.7 Location of Equipment and Outlets

A. The approximate locations of cabinets, panelboards, wiring gutters, switches, light outlets, power outlets, etc., are indicated on the drawings; these locations, however, are not intended to give complete and accurate information. Determine the exact location after thoroughly examining the general building plans and by actual measurements during construction, subject to the approval of the Architect.

B. VERIFY WITH ARCHITECT, prior to installation, all locations of conduit, boxes, etc., stubbed or in the floor.

3.8 Labeling and Identification

A. Provide nameplates which shall have engraved lettering not less than 3/8 inch high and shall be white core laminated plastic, having white letters on black background. Embossed plastic adhesive tape is not acceptable.

(1) Provide nameplates on the exterior of all panelboards, special system cabinets and disconnect switches. Such labels shall indicate equipment designation, voltage, phase and service source. (Example: “Panel A, 208/120V, 30, 4W”).

(2) Provide nameplates on each separately mounted disconnect, controller, etc. for all mechanical systems, motors, or fixed appliances. Such labels shall indicate motor or appliance designation, voltage, phase, and service source. Motor or appliance designations shall be as given on the mechanical or architectural plans. (Example: “AHU-2, 208V, 30, Fed from Panel A, cct. 7”).

(3) Refer to the other Division 16 specification sections for further nameplate requirements.

B. Provide panelboard schedules as follows:

(1) Provide neatly typed directories on removable stiff cards and protective plastic face in metal cardholders for all branch circuit panelboards. Refer to Section 16134-PANELBOARDS for additional requirements on directories.

3.9 Excavation and Backfilling

A. Perform excavation, backfilling and repaving required for work under this Division in accordance with DIVISION 2, SITE WORK. In general, backfill and tamp with compaction at least equal to that of the surrounding area.

3.10 Warranty

A. Deliver original of all guarantees and warranties on this portion of the work to Owner. Warrant all equipment, materials and workmanship for one year, in accordance with the terms of the Contract.

End of Section 16010

SECTION 16120

CONDUCTORS

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Related Work in Other Sections

A. Section 16010, General Electrical Provisions; Section 16450, Grounding.

PART TWO – PRODUCTS

2.1 Wires and Cables (600 Volts)

A. Type: Conform to the applicable UL and ICEA Standards for the use intended. Copper conductors with 600 volts insulation unless otherwise specified or noted on the Drawings.

B. Use of aluminum conductors will not be permitted.

C. Insulation: Type THHN/THWN-2 or MTW insulation for No. 8 and smaller unless otherwise specified or noted on the Drawings. Type THHN/THWN-2/MTW for conductors No. 6 or larger and elsewhere as required by the NEC. 90 degrees C. minimum insulation within fixture wire ways of fluorescent fixtures.

D. Size: No. 12 minimum unless otherwise specified or noted on the Drawings. Not less than the NEC requirements for the system to be installed. If the equipment to be installed requires larger conductor and conduit sizes than indicated on the Drawings, the required changes shall be made without additional charge to the Owner. 120 volt, 20 amp, branch circuit runs which exceed 70 feet in length shall be No. 10 minimum.

E. Color Coding: Phase, neutral and ground conductors for branch circuits and feeders shall be color-coded in accordance with the NEC. Connect for branch circuits and feeders all conductors of the same color to the same phase conductor. Color coding shall be A-black, B-red, C-blue, N-white, for 120/208 volts, with green for all ground conductors. Conductors No. 12 and 10 shall be solid color compounded for the entire length.

2.2 Splices and Taps

A. For Copper Conductors No. 6 and Smaller: 3M Scotch-Lok or T & B Sta-Kon compression or indent type connectors with integral or separate insulating caps.

B. For Copper Conductors Larger Than No. 6: Solderless, indent, hex screw or bolt type pressure connectors. Bolted-type fittings which need to be covered by tape are not approved.

2.3 Tape

A. Plastic tape, 8.5 mils minimum thickness, 1,000,000 ohms minimum insulation resistance, oil resistant vinyl backing, oil resistant acrylic adhesive, incapable of supporting combustion per ASTM D-568 Test Method B.

PART THREE – EXECUTION

3.1 Splices (480 Volts and Under)

A. Permitted only at outlets or accessible enclosures. Conductor lengths shall be continuous from termination to termination without splices, unless approved by the Architect.

3.2 Pull Wires

A. In each empty conduit, except underground conduits, install a No. 14 galvanized steel pull wire or a nylon rope having a tensile strength of not less than 200 pounds. In each empty underground conduit install a No. 10 AWG bare, hard drawn copper or copper clad pull wire or a nylon rope having a tensile strength of not less than 200 pounds.

3.3 In Raceways

A. Install conductors in rigid conduit, EMT or flexible metallic conduit, unless otherwise specified or noted on the Drawings.

3.4 Cable Bends

A. Radius of bends not less than 10 times the outer diameter of the cable.

3.5 Bundling

A. Conductors, No. 10 and smaller, shall be neatly and securely bundled. Conductors larger than No. 10 shall be neatly and securely cabled into individual circuits, utilizing marlin twine, two-ply lacing or nylon straps.

3.6 Conductor Pull

A. Conductors shall not be pulled into conduits until after all plastering or concrete work is completed and all conduits in which moisture has collected have been swabbed out.

3.7 Connectors and Lugs

A. Install with manufacturer's recommended tools and with the type and quantity of deformations recommended by manufacturer.

End of Section 16120

SECTION 16134

PANELBOARDS

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Related Work in Other Sections

A. Section 16010, General Electrical Provisions

1.3 Submittals

A. Submit complete shop drawings, product data and installation information. Provide outline dimensions, descriptive literature for cans, panel interiors and protective devices (including time-current curves for all protective devices); and, schedules indicating the panel interior characteristics and circuiting indicating the frame size, trip setting, class and interrupting rating for all overcurrent devices and the associated load served. Identify available spares and spaces. Show range of conductors accepted by main bus bars or main protective device, and each protective device.

PART TWO – PRODUCTS

2.1 General

A. Dead front, safety type, with voltage ratings as scheduled. Panelboards shall be of the type required for the short circuit and duty ratings indicated on the Drawings or specified. All panelboards shall have a neutral bus, a ground bus and shall be circuit breaker type as scheduled. Panelboards shall be a manufactured by Siemens/ITE, Square D or General Electric.

2.2 Cabinets

A. Each panelboard shall be enclosed in a single sheet metal cabinet with front doors, catches, locks, etc.

B. Space Only: Where "space only" is noted on the Drawings, provide necessary connectors, mounting brackets, etc., for the future insertion of an overcurrent device. Spaces shall be sized for up to 100 amp, single pole devices unless noted otherwise.

C. Nameplate: Refer to Section 16010 for nameplate/labeling requirements.

2.3 Branch Circuit Panels

A. All branch circuit panels for lighting and single-phase loads shall have inverse time circuit breakers with interrupting capacity, and main lugs or main breaker sized as indicated on the Drawings. Circuit breakers providing motor short circuit protection shall have trip elements sized to meet code requirements or equipment manufacturer's recommendations, whichever are smaller.

B. Breakers: Molded-case, as scheduled or required. Provide quick-make and quick-break toggle mechanism, inverse time trip characteristics and trip free operation on overload or short circuit condition. Automatic tripping shall be indicated by a handle position between the manual OFF and ON position. Provide trip ratings as indicated in the panelboard schedules. Adjustable magnetic trip devices shall be set at the factory to the lowest trip setting. Provide breaker frame sizes as required for the continuous rating or the interrupting capacity, whichever is larger.

C. Bolted Type: Circuit breaker current carrying connections to the bus shall be of the bolt-on type, factory assembled. Stab-in (plug-in) type not permitted. Provide bus bars for three phase panelboards of the sequence-phased type, connected and arranged for 3 phase, 4 wire mains, unless otherwise indicated on the Drawings.

D. Space Only: Where "space only" is noted on the Drawings, provide necessary connectors, mounting brackets, etc., for the future insertion of an overcurrent device.

E. Directories: Provide directory holder with directory card insert on inside of panel door.

F. Skirts: Where noted on the Drawings, panelboards shall be skirted, with complete metal enclosures and barriers separating the panel interior.

2.4 Bus Bars

A. All bus bars shall be copper, with silver-plating at point-of-connection. Use of aluminum bus bars will not be permitted.

B. Provide required quantity and size of lugs to accommodate feeder run(s) serving the panelboard.

C. Provide minimum ½ capacity ground bus.

D. Neutral bus shall be double capacity where indicated on the panel schedules, or where loads to be served are primarily non-linear, in nature.

PART THREE – EXECUTION

3.1 Circuit Numbering

A. Circuit numbering shown on the Drawings is based on pole position in the panelboard and not consecutive numbering. Circuit layout shall match circuiting indicated on panel schedules to the greatest extent possible.

3.2 Panel Directories

A. Provide typewritten panel directory. Refer to Section 16010 for circuit identification requirements.

3.3 Phase Rotation

A. Phase A, left bus; phase B, center bus; phase C, right bus (front viewing).

3.4 Installation

A. Locate panelboards per drawing layout or as required to maximum space available for future addition of panelboards in the associated room/area.

End of Section 16134

SECTION 16140

WIRING DEVICES AND PLATES

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Related Work in Other Sections

A. Section 16010, General Electrical Provisions; Section 16450, Grounding.

PART TWO- PRODUCTS

2.1 Snap Switches

A. Unless otherwise specified, each snap switch (flush tumbler-toggle) shall be of the A.C. General use type for mounting a single gang spacing, fully rated 20 amperes minimum at 120/277 volts, conforming to minimum requirements of the latest revision of the Underwriter's Laboratories, Inc., UL 20 Fifth Edition Standard Snap Switches and further requirements herein specified. Specification grade, heavy duty, single pole, 3-way or 4-way, of the maintained, momentary or lock type as indicated on the Drawings. Ivory color handles unless otherwise indicated on the Drawings. Silver or silver alloy contacts. A.C. 120/277 volt general use snap switches shall be capable of withstanding tests as outlines in NEMA Publications and shall be as follows unless otherwise noted.

20A 120/277 AC	Hubbell	P&S	Arrow Hart	Leviton
1P	1221-I	20-AC-1-I	1221-I	1221-2I
3-Way	1223-I	20-AC-3-I	1223-I	1223-2I
4-Way	1224-I	20-AC-4-I	1994-I	1224-2I
Illum. Red handle, 1P (pilot light)	1221-PL7	20-AC-1-RPL	1991-PL7	1221-7PG
Lock Type, 1P	1221-L	20-AC-1-L	1991-L	1221-2IL

2.2 Receptacles

A. General: Configuration and requirements for all connector or outlet receptacles shall be in accordance with NEMA Publications.

B. Fire resistant, non-absorptive, thermoplastic composition (nylon or Lexan) covers and bodies with one-piece, brass mounting strap (ground contacts integral with the mounting strap). Single or duplex as indicated. Ivory color unless otherwise noted or indicated. Triple-wipe, t-slot contacts for each plug blade.

C. Grounding Type: All receptacles shall be grounding type with a green colored hexagonal equipment brass ground screw of adequate size to accommodate an insulated grounding jumper (based on Table 250-122 of the NEC with minimum size No. 14 AWG). Grounding system shall be rivotless, single piece brass with no mechanical connections in the primary path between the point of ground wire termination and ground blades. Provide isolated ground type where indicated on the Drawings.

D. Unless otherwise noted, duplex receptacles shall typically be 15 amperes (20 amperes, if the only device on a circuit) as follows:

Device	Hubbell	Arrow Hart
15A-125V AC 2P 3W	5262-I	5262I
20A-125V AC 2P 3W	5362I	5362I
20A-125V AC 2P 3W G.F.C.I.	GF5362I	GF5342I
20A-125V AC 2P 3W Isol. Grd.	IG-5362	IG5362

E. Special: Receptacles for special applications shall be as indicated on the Drawings.

F. G.F.C.I.: All 15 amp and 20 amp, 125V receptacles installed within 6 feet of any sink or basin, in bathrooms, or installed outdoors or on rooftops shall have G.F.C.I protection.

G. Rooftop, or other locations, Receptacles: Provide a 20 amp duplex G.F.C.I. receptacle in weatherproof box with weatherproof cover within 25 feet of each mechanical unit (or group of units) on the roof. Extend 120V circuit to panel. (Do not serve from circuit serving mechanical unit load(s).)

H. Outlet Strip Receptacles – Wire Mold V4000 Series, Color to match Storefront, Dark Bronze.

2.3 Device Plates

A. General: Provide plates for each switch, receptacle, data, telephone and video outlet, and special purpose outlet. Do not use sectional gang plates. Provide multi-gang outlet plates for multi-gang boxes. In general, plates shall be non-magnetic, type 302/304, super stainless steel, with smooth contoured edges, satin finish, specification grade, unless indicated otherwise. Provide nylon plates in areas specifically indicated.

B. Exposed: Plates for exposed screw jointed fittings shall match the fittings with edges of plates flush with edges of fittings. Heavy cadmium plates, steel with gasket. Plates for cast type boxes at locations subject to wet or rain conditions shall be of the cast, vapor tight type. Provide hinged lift covers for devices.

C. Communications: In general, plates for telephone, data and video rough-in outlets shall be blank, stainless steel, specification grade, unless indicated otherwise. Provide nylon plates in areas specifically indicated. Wall plates for push button and buzzer outlets shall have openings to suit the push buttons ad buzzers.

PART THREE – EXECUTION

3.1 Device Plates

A. Install with alignment tolerance of one-sixteenth inch from horizontal and all edges in continuous contact with wall surfaces.

3.2 Duplex Receptacle Mounting

A. Receptacles shall be mounted so that the ground slot is located on top.

End of Section 16140

SECTION 16740

TELEPHONE AND DATA SYSTEM

PART ONE – GENERAL

1.1 Related Documents

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

1.2 Telephone and Data System, Generally

A. The Telephone and Data System shall be as indicated on the Drawings and specified with underground service entrance to the main telephone equipment room (MDF). Conduit runs back to the equipment board shall connect the telephone and data outlets to the terminal board. Telephone and data wiring will be provided by Contractor.

B. Contractor to provide and install outlet boxes, wire receptacles in designated room areas and leave wire rolled up in I.S. Room 120. Owner will, under separate contract, tie cables into existing relocated I.S. Equipment.

PART TWO – PRODUCTS

2.1 General

A. Cabinets, outlet boxes, device plates, conduits, conduit bushings, pull wires, etc., shall be as indicated on the Drawings and specified elsewhere in these specifications.

PART THREE – EXECUTION

3.1 Conduit

A. Install ¾ inch conduit between telephone and/or data outlets and one inch conduit home runs, unless noted. Not more than two (2) 90-degree bends or their equivalent allowed between any two (2) adjacent points. Use long-radius bends on service entrance and feeder conduits.

3.2 Pull Wires

A. Install pull wire in each telephone and/or data conduit.

3.3 Ground

A. Install No. 6 ground wire in ½ inch conduit from the main telephone equipment board to the nearest cold water pipe, unless otherwise noted.

3.4 Conduit Stubs

A. Stub feeder conduits to the left side of the terminal boards and branch conduits to the right side of the terminal board, unless otherwise noted. Provide insulated conduit bushings.

3.5 Power Requirements

A. Coordinate power requirements (required receptacle locations, surge suppression needs, power loads, etc.) with the Owner.

3.6 Coordination

A. Details, exact locations and arrangement of the telephone facilities shall be coordinated with, and as recommended and approved by, the Owner's telephone representatives. This includes the location and orientation of lights, receptacles, service entrance conduits, and conduit stubs in the main equipment room (MDF).

B. Details, exact locations and arrangement of the Owner's data facilities shall be coordinated with, and as recommended and approved by the Owner and his data Consultant/Supplier.

End of Section 16740