Santa Fe Civic Housing Authority
Santa Fe Family Living:  Senda Lane

Project Manual

Owner: Santa Fe Civic Housing Authority
664 Alta Vista
Santa Fe, NM 87501
Ed Romero, Executive Director
Rudy Gallegos, Deputy Director and
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PROJECTS Standard Form of Agreement Between Owner and Contractor where the basis of payment is a STIPULATED SUM


THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS COMPLETION OR MODIFICATION.

AGREEMENT made as of the _____ day of ___________ in the year of 2013.

BETWEEN the Owner: Santa Fe Civic Housing Authority
664 Alta Vista Street
Santa Fe NM 87505
(505) 988 2859

And the Contractor: ____________________________
____________________________
____________________________
____________________________

The Project is: Housing Restoration & Construction Project
City of Santa Fe,
Town of Bernalillo
City of Espanola

The Architects are: Autotroph Inc. for Bernalillo
Thomas Gifford for City of Santa Fe
Dekker, Perish & Sabatini for the City of Espanola
ARTICLE 1 THE CONTRACT DOCUMENTS
The Contract Documents consist of this agreement, the PROJECTS Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents other than Modifications, appear in Article 8.

ARTICLE 2 THE WORK OF THIS CONTRACT
The Contractor shall fully execute the Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
3.1 The date of commencement of the Work shall be established in two notices to proceed. The first notice to proceed shall be issued by the owner prior to the purchase of any stored materials; the first notice to proceed shall grant contracting authority to the Contractor to procure materials through subcontracts. The second notice to proceed shall be issued once building permits have been issued for the work and no sooner than 21 days following nor later than 45 days following issuance of the first notice to proceed. The second notice shall grant authority to the contractor to start on-site activities construction activities. Plus any time in 3.1.1

3.1.1 If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanic’s liens and other security interests. The Owner’s time requirement shall be as follows:

3.2 The Contract Time shall be measured from the Date of Commencement (date of Second Notice to Proceed). The Owner and Contractor have agreed on a Project Schedule, attached as Exhibit “D” which identifies milestones for the Work, including, but not limited to, all major subcontractors: commencement and completion dates as well as dates for substantial completion and temporary occupancy. The Project Schedule considers and includes time required for all activities and events that may be normally encountered in the course of project. Project schedule Date of Commencement to be adjusted to the date referenced in the second notice to proceed.

3.3 The Contractor shall achieve Substantial Completion of the entire Work no later than 240 calendar days from the date of Commencement, subject to adjustments of this Contract Time as provided in the Contract Documents. The Contractor acknowledges that time is of the essence for this Contract and that timely Substantial Completion of the Work is of critical importance to the Owner.

3.4 If Contractor fails to achieve Substantial Completion of the Work within thirty (30) days after the required date for Substantial Completion, Contractor shall pay to Owner as liquidated damages, and as Owner’s sole remedy for such late completion, an amount equal to $100 per day for each full business day, Monday through Friday, between the required Substantial Completion date and the date that Contractor achieves Substantial Completion of the Work. The parties agree that Owner’s actual damages for late completion are extremely difficult and impracticable to ascertain, and that such liquidated damage calculation is a reasonable estimate of the amount of damages Owner will suffer and is not a penalty.

ARTICLE 4 CONTRACT SUM
4.1 The Owner shall pay the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be: $ ________________________, subject to additions and deductions as provided in the Contract Documents.
4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner: None

4.3 Allowances, if any, are as follows: The Contract Sum in 4.1 includes the following allowances: None

ARTICLE 5 PAYMENTS

5.1 PROGRESS PAYMENTS

5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

5.1.3 Provided that an Application for Payment is received by the Architect not later than the [25th] day of a month, the Owner shall make payment to the Contractor not later than the [15th] Day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than Fifteen [25] days after the Architect receives the Application for Payment.

5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect shall be used as a basis for reviewing the Contractor’s Applications for Payment.

5.1.5 Applications for Payment indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. Each Application for Payment shall include properly executed, unconditional waivers of lien for the immediately preceding pay period from the Contractor and every subcontractor with a contract valued over Five thousand dollars ($5,000.00) within the scope of the Work for which the Contractor seeks progress payment. These lien waivers shall comply with the law of the state where the Project is located.

5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less no retainage. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Subparagraph 7.3.8 of the PROJECTS General Conditions;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less no retainage.;

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of the PROJECTS General Conditions.
5.1.7 The progress payment amount determined in accordance with Subparagraph 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, and subject to Subparagraph 5.2.3, below, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsealed claims; and

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Subparagraph 9.10-3 of the PROJECTS General Conditions.

5.1.8 Reduction or limitation of retainage, if any, shall be as follows: No retention on this contract.

5.1.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site. Contractor has owner’s approval for payment for off-site storage of material provided they are suitably stored and insured.

5.2 FINAL PAYMENT

5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when:

.1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Subparagraph 12.2.2 of the PROJECTS General Conditions, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

5.2.2 The Owner’s final payment to the Contractor shall be made no later than thirty (30) days after the issuance of Substantial Completion.

5.2.3 If Contractor fails to complete any punch list, repair or replacement item, Owner shall withhold from final payment a sum equal to 1.5 times (150%) the amount that the Owner or Architect, at Owner’s option, estimates for the cost of completing each such item. The balance of any sum(s) so withheld, if any, shall be paid to Contractor upon completion of the item(s) by Owner and payment therefore from the withheld sum(s).

ARTICLE 6 TERMINATION OR SUSPENSION

6.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the PROJECTS General Conditions.

6.2 The Work may be suspended by the Owner as provided in Article 14 of the PROJECTS General Conditions.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the PROJECTS General Conditions to the Construction Contracts or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. The rate of interest shall be Prime + 8 percent, compounded monthly.

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner’s and Contractor’s principal places of
7.3 The Owner’s representative is: Ed Romero
Santa Fe Civic Housing Authority
64 Alta Vista Street Santa Fe, NM 87125
(505) 988 2859

7.4 The Contractor’s representative is:

__________
__________

7.5 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days written notice to the other party.

7.6 Other provisions:
7.6.1 Contractor will provide list of Subcontractors to Owner for the project upon request.

7.6.2 Contractor shall not assign or sublet its obligations to perform this Agreement or any portion of the Work without Owner’s prior written consent. Any assignment or subletting without such written consent shall be void. Owner’s consent to any such assignment or subletting shall not in any manner relieve Contractor of its obligations to Owner for performance of the Work, and contractor shall remain fully liable for the work of its suppliers, assignees and Subcontractors. This section does not apply to Subcontractors.

7.6.3 Contractor shall include with every Subcontract agreement the following language: “Subcontractor binds itself to Contractor and Owner, and is obligated to Contractor and Owner, in the same manner and to the same extent that Contractor is bound and obligated to Owner under the Prime Contract. All rights which Owner may exercise and enforce against Contractor may be exercised and enforced by Contractor against Subcontractor. In the event of any dispute between the Owner and Contractor, Subcontractor shall be bound by all decisions, directives, interpretations and rulings of the Owner or the Architect, at Owner’s option, including Owner’s termination or suspension of Contractor.”

7.6.4 Contractor represents that (1) it has sufficient knowledge and expertise to construct the Work in accordance with all applicable codes and regulations; (2) it has reviewed, analyzed, and has current knowledge of the site; and (3) it has reviewed, analyzed, and has found sufficient for completion of the Work the Contract Documents listed in Article 8 of this Agreement. Contractor acknowledges and warrants that any exceptions to this representation have been specifically identified in the Contract Documents. Contractor further represents and warrants that it can and will complete the Work for the Contract Sum identified in Article 4 of this Agreement, and that no sums additional to the Contract Sum are required for Contractor’s completion of the Work as identified in this Agreement, except as otherwise provided in the Contract Documents.

8.1 Contractor is entering into this Agreement on the express understanding that the Project will be used solely as an apartment project, and not as condominiums, which condominium use would entail significantly higher risk for Contractor and which risk Contractor is not willing to assume. In the event the Project is ever converted to condominiums, Contractor shall have no further obligation or liability
under any legal theory and shall be released from any further obligation under this Agreement or at law, and
Owner shall indemnify, defend, protect and hold harmless Contractor from and against any cost, claim or
expense arising after such conversion, including without limitation direct or indirect claims from unit buyers
or the condominium owners’ association.

8.2 As the formation or presence of mold or fungi in a building is dependent upon a broad range of factors
including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures,
climatic conditions, relative humidity and heating/ventilation systems and their maintenance and
operating capabilities, the Contractor shall not be liable for any claims, repairs, restoration,
damages, or injuries relating to the presence of any irritants, contaminants, vapors, fumes, molds,
fungi, bacteria, spores, micro-toxins, or the like in any building or in the air, land or water serving the
Project.

8.3 New Mexico State and Local (City of Santa Fe, Town of Bernalillo, City of Espanola New Mexico)
New Mexico Gross Receipts Tax will be billed to the Owner by the Contractor at the current tax rate in
addition to the monthly draw request, it is based upon the area of construction, any fluctuations of the state
of local tax rate or contract amount shall be adjusted.

ARTICLE 8 ENUMERATION OF CONTRACT DOCUMENTS

8.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are
enumerated as follows: 8.1.1 The Agreement is this executed version of the PROJECTS Standard
Form of Agreement Between Owner and Contractor, Stipulated Sum [Modified Form of AIA

8.1.2 The General Conditions are the PROJECTS General Conditions of the Contract for
Construction [Modified Form of AIA Document 201-1997; 1998 edition, with revisions. (“Exhibit
A”)

8.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project
Manual Request for Proposal document dated ______   (Pages 1-34) and otherwise as
follows: N/A

8.1.4 The Specifications are those contained in the Project Manual dated as in Subparagraph 8.1.3,
and are as follows: (Refer to Exhibit No. B, which describes all Specifications for the Project,
attached to this Agreement).

8.1.5 The Drawings are as dated and described in Exhibit B: (Refer to Exhibit No. B, which lists all
drawings and the dates thereof, attached to this Agreement).

8.1.6 The Addenda, if any, are as follows;

8.1.7 Other documents, if any, forming part of the Contract Documents are as follows:
Exhibit “B” List Bidding Documents, Specifications, Drawings
Exhibit “C” Schedule of Values
Exhibit “D” Project Schedule
Housing Programs Attached by Reference, in the event of duplicate clauses, the most
stringent will prevail.
Exhibit “F” Davis Bacon Prevailing Wage Rate and Certified Payroll Administration
This Agreement is entered into as of the day and year first written above and is executed in at least three original copies, of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER (Signature)  
Ed Romero, Executive Director of Santa Fe  
Date  
Civic Housing Authority 664 Alta Vista Street  
Santa Fe, NM 87125 (505) 988 2859  

CONTRACTOR (Signature)  
Date
ARTICLE I GENERAL PROVISIONS

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

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

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

1.1.4 THE PROJECT
The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

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

1.1.6 THE SPECIFICATIONS
The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.
1.1.7 THE PROJECT MANUAL
The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

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

1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.2.3 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 In the event of conflicts, inconsistencies, discrepancies or ambiguities between or among the Contract Documents, interpretations shall be based on the following order of precedence:
   
   .1 Modifications of the Contract, as defined in Subparagraph 1.1.1 with those of later date having precedence over those of earlier date, and with those of the same date having precedence bed on items .2-.6 of this Clause.
   .2 The Agreement, as modified, with changed or added language taking precedence over pre-printed text.
   .3 These General Conditions, as modified, with changed or added language taking precedence over preprinted text.
   .4 Addenda, with those of later date having precedence over those of earlier date.
   .5 The Drawings, with those in larger scale having precedence over those in smaller scale, and with notes and schedules having precedence over the remainder.
   .6 The Specifications.

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

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

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

1.5.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.
1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

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

ARTICLE 2 OWNER

2.1 GENERAL

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

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

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

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

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

2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor’s performance of the Work under the Owner’s control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

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

2.3 OWNER’S RIGHT TO STOP THE WORK
2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3. Article 14, as amended below, addresses the Owner’s right to take temporary possession of the Project and terminate this Contract. Article 14 does not affect or diminish in any way the Owner’s right to stop the work under this Paragraph 2.3.1.

2.4 OWNER’S RIGHT TO CARRY OUT THE WORK
2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven day period give the Contractor a second written notice to correct such deficiencies within a three day period. If the Contractor within such three day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies. If payment then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
3.1 GENERAL
3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

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

3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.
3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect.

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

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor’s employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.
3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

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

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

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

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

3.5.2 Contractor’s warranty shall be: twelve (12) months beginning on the date when a temporary Certificate of Occupancy is delivered, to the Owner or Architect, on a building by building basis. Overall site warranty begins on an area by area basis as the building or buildings are turned over to the Owner from the Contractor. Contractor acknowledges that the cost for all warranty work and obligations has been included in the Contract Sum.

3.5.3 Contractor shall ensure that all manufacturer warranties, and all extended warranties required by the Contract, run in favor of the Owner.

3.6 TAXES
3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. If the jurisdiction granted authority to modify the taxable rate indeed modifies the rate during the course of work and the Contractor becomes liable for this revised rate, the Owner shall provide additional funds to adequately compensate for any increase or shall reduce compensation to reflect any decrease.

3.7 PERMITS, FEES AND NOTICES
3.7.1 Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.
3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

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

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

3.7.5 The requirements of Subparagraphs 3.7.2, 3.7.3, and 3.7.4 shall not diminish or limit Contractor’s responsibility for compliance with all standards and requirements of the Contract Documents, particularly in the event that such standards or requirements may exceed the requirements of local laws, codes, ordinances, rules, regulations or lawful orders of any authorized public entity with respect to the quality, character, methods, and craftsmanship required for the Work.

3.7.6 Contractor shall be fully qualified under all applicable state or local licensing laws in effect at the time and location of the Work. Contractor shall possess a current license for the appropriate classification of work activity before submitting any bid for Project Work; and Contractor shall be responsible for determining that each of its prospective or actual Subcontractors or suppliers have been duly licensed in accordance with law.

3.8 ALLOWANCES

3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site, less applicable trade discounts;

.2 allowances shall also cover Contractor’s reasonable costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts and shall be in addition to the Contract Sum;

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Clause 3.8.2.1 and (2) changes in Contractor’s costs under Clause 3.8.2.2.

3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.
3.9 SUPERINTENDENT
3.9.1 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The Superintendent shall represent Contractor, and written communications given to the Superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed upon written request of the Owner, Architect, or Contractor.

3.10 CONTRACTOR’S CONSTRUCTION SCHEDULES
3.10.1 Upon execution of this Contract, Contractor shall provide Owner and Architect with a Critical Path Method Schedule (“CPM Schedule”) for the Work. The CPM Schedule shall not exceed the time limits required by the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work, shall be related to the entire Project to the extent required by the Construction Documents, and shall provide for expeditious and practicable performance of the Work. Where the term “construction schedule is used in the Contract Documents, it shall mean the CPM Schedule.

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

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

3.10.4 During the course of performance of the Work, the Contractor shall provide the Owner and Architect with a quarterly CPM Schedule summary report in a form reasonably acceptable to the Owner and Architect. At a minimum, the report shall indicate whether Work performance is on, ahead of or behind schedule; and if Work performance is behind schedule, the report shall include Contractor’s plan for accelerating or expediting the Work to achieve timely Substantial Completion.

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

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

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

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

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

3.12.5 The Contractor shall review for compliance with the Contract Documents,
approve and submit to the Architect Shop Drawings, Product Data, Samples and
similar submittals required by the Contract Documents with reasonable promptness and
in such sequence as to cause no delay in the Work or in the activities of the Owner or
of separate contractors. Submittals which are not marked as reviewed for compliance
with the Contract Documents and approved by the Contractor may be returned by the
Architect without action.

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

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

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

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

3.12.10 The Contractor shall not be required to provide professional services.

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

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

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

3.15 CLEANING UP

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

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

3.16 ACCESS TO WORK

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

3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

3.18 INDEMNIFICATION

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

3.18.2 In claims against any person or entity indemnified under this Paragraph 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.
3.18.3 This agreement shall not obligate Contractor to indemnify against liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of the indemnitee, his agents or employees; provided that Contractor shall be obligated to indemnify against liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the concurrent negligence of (a) the indemnitee or the indemnitee’s agents or employees, and (b) Contractor or Contractor’s agents or employees, to the extent of Contractor’s negligence. Contractor, for itself, and its consultants and subcontractors, specifically and expressly waives the right to assert against the indemnities any immunity that may be granted it under the Washington State Industrial Insurance Act, Title 51 RCW. Contractor shall include such waiver in all agreements with consultants and subcontractors. These waiver provisions have been mutually negotiated by the parties and it is the intent of the parties that to provide the broadest scope of indemnity permitted by the Revised Code of Washington 4.24.115.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

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

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

4.1.3 If the employment of the Architect is terminated, the Owner shall employ a new Architect against whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the former Architect.

4.2 ARCHITECT’S ADMINISTRATION OF THE CONTRACT
4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner’s representative (1) during construction, (2) until final payment is due and (3) with the Owner’s concurrence, from time to time during the period for correction of Work described in Paragraph 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

4.2.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor’s operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance, with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor’s rights and responsibilities under the Contract Documents, except as provided in Subparagraph 3.3.1.
4.2.3 The Architect will not be responsible for the Contractor’s failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

4.2.4 Communications Facilitating Contract Administration. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with separate contractors shall be through the Owner.

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

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

4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor’s submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect’s action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect’s professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect’s review of the Contractor’s submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect’s review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect’s approval of a specific item shall not indicate approval of an assembly of which the items is a component.

4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner, for the Owner’s review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

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

4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect’s response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which
interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and initial decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

4.3 CLAIMS AND DISPUTES

4.3.1 A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term “Claim” also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Time Limits on Claims. Claims by either party must be initiated within 60 days after occurrence of the event giving rise to such Claim or within 60 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Architect and the other party.

4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Subparagraph 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 60 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

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

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

4.3.7 Claims for Additional Time

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

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

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

4.3.9 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

4.3.10 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

1. damages incurred by the Owner for rental expenses, for losses of financing, business and reputation, and for loss management or employee productivity or of the services of such persons; and
2. damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for loss of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to the above-referenced consequential damages due to either party’s termination in accordance with Article 14.

4.4 RESOLUTION OF CLAIMS AND DISPUTES

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

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

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

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

4.4.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and which shall notify the parties of any change in the Contract Sum or Contract Time or both.

4.4.6 When a written decision of the Architect states that (1) the decision is final but subject to mediation, arbitration or litigation and (2) a demand for arbitration or the commencement of litigation regarding a Claim covered by such decision must be made within 60 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration or commence litigation within said 60 days’ period shall result in the Architect’s decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration or litigation proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration or litigation proceedings unless the decision is acceptable to all parties concerned.

4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor’s default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

4.4.8 If a Claim relates to or is the subject of a mechanic’s lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, or by mediation, arbitration or litigation.

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

4.5.2 The parties shall endeavor to resolve their arbitrable Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.
**4.5.3** The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

**4.6 ARBITRATION**

**4.6.1** Every Claim arising out of or related to the Contract of a total value or amount of less than $50,000.00, except for Claims made pursuant to Article 14 or Claims relating to aesthetic effect, and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect, or absent any decision for 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 4.5.

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

**4.6.3** A demand for arbitration shall be made within the time limits specified in Subparagraph 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

**4.6.4** Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect’s employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

**4.6.5** Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

**4.6.6** Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

**4.7 LITIGATION**

**4.7.1** “Litigable Claims” are all claims of a total value or amount of $50,000.00 or more, or any Claims made or disputes pursuant to Article 14, or any other Claims which the parties shall mutually agree are best resolved by litigation. All Litigable Claims shall be decided in a court of competent
jurisdiction, and Commencement of such court proceedings shall occur upon the date of filing of a sufficient Complaint regarding any Litigable Claim. Prior to litigation, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 4.5.

4.7.2 Commencement of litigation shall be made within the time limits specified in Subparagraph 4.4.6 or otherwise within a reasonable time after the Litigable Claim has arisen; but in no event may litigation of any Claim be commenced after the date when said Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

14.2.2 If any of the parties shall Commence Court proceedings with respect to a Litigable Claim, then all parties to such proceedings shall be deemed to have preserved all rights, remedies, defenses and entitlements with respect to the Litigable Claims as of the date of Commencement; but thereafter, the rights, remedies, defenses and entitlements of the parties shall be determined by the applicable laws and rules of the jurisdiction where filing occurs.

14.2.3 Notwithstanding any provision of this Agreement to the contrary, Contractor may files liens or initiate lien foreclosure proceedings as necessary to meet any applicable statute of limitations.

ARTICLE 5 SUBCONTRACTORS

5.1 DEFINITIONS

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

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

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

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special, design) proposed for each principal portion of the Work. The Architect will reply to the Contractor in writing within 10 days of receipt thereof stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply within 10 days of receipt shall constitute notice of no reasonable objection. See also Paragraph 7.6.1 of the Agreement.

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

5.2.3 If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work.

5.2.3.1 No approval or disapproval by the Architect or Owner of any particular Subcontractor shall relieve Contractor of its responsibility for performance of the Work. Furthermore, Contractor is not
relieved of its responsibility for selection of particular processes or materials for the performance of the Work by any Owner or Architect.

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

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

5.3.2 Any part of the Work performed for the Contractor by a Subcontractor shall be pursuant to a written Subcontract agreement in a form reasonably approved by the Owner and which meets all requirements of [Paragraph 7.5 of the PROJECTS form of Stipulated Sum Agreement] or [Paragraph 10.4 of the PROJECTS form of Guaranteed Maximum Price Agreement].

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS
5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

   .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Paragraph 14.2 of these General Conditions only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and

   .2 assignment is subject to the prior rights of the surety, if any, obligated under a performance or payment bond for the Project.

5.4.2 Upon such assignment, the Subcontractor’s compensation shall be equitably adjusted for increases in cost resulting from any suspension of Work for more than 30 days.

5.4.3 Nothing in this Paragraph 5.4 shall alter the Contractor’s obligation to include within its Subcontract Agreements the language set forth in [Paragraph 7.6 of the PROJECTS form of Stipulated Sum Agreement] or [Paragraph 10.4 of the PROJECTS form of Guaranteed Maximum Price Agreement].
ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Paragraph 4.3.

6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term “Contractor” in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

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

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

6.2 MUTUAL RESPONSIBILITY

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

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

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

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5.
6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Subparagraph 3.14.

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

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

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

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

7.1.4 Any adjustment to the Contract Sum or Contract Time arising out of any changes in the Work shall be signed in writing by the Owner. If the Contractor believes a change in the Work has been directed for which an adjustment in the Contract Sum or Contract Time is due, and there is not a written directive for such change signed by the Owner, then the Contractor shall, as a condition precedent to preservation of any claim pertaining to such change, give written notice to the Owner and Architect within twenty one (21) days following the Work involved in the change (except for emergency conditions endangering life or property, as provided in Paragraph 10.3 of these General Conditions). The written notice shall identify (i) the scope and nature of the change in the Work and (ii) the impact said change will have upon the Contract Sum or Contract Time. In the notice, the Contractor shall provide and identify specific cost impacts, if any, and the specific extent of additional time to perform, if any, sought for adjustment to the Contract Sum and Contract Time by reason of the change. In the alternative, Contractor shall use its best efforts to provide specific maximum estimates of the costs and additional time required as a result of the alleged change. Contractor’s failure to give timely written notice shall constitute a waiver of any claims for adjustment to the Contract Sum or Contract Time not otherwise approved in writing by the Owner, it being expressly understood that such notice, timely given, is a condition precedent to Contractor’s claim.

7.2 CHANGE ORDERS
7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect, stating their agreement upon all of the following:

.1 change in the Work;
.2 the amount of the adjustment, if any, in the Contract Sum; and
.3 If the change involves an increase in the contract amount the contractor will be entitled to reasonable Overhead and profit.
 .4 the extent of the adjustment, if any, in the Contract Time.

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

7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 unit prices stated in the Contract Documents or subsequently agreed upon;

.3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 as provided in Subparagraph 7.3.6.

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

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clause 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.6 shall be limited to the following:

.1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers’ compensation insurance;

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

.3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
.5 additional costs of supervision and field office personnel directly attributable to the change.

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

7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by the Change Order indicating the parties’ agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4.

7.3.9 When the Owner and Contractor agree with the determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

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

ARTICLE 8 TIME
8.1 DEFINITIONS
8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.2 The date of commencement of the Work is the date established in the Agreement.

8.1.3 The date of Substantial Completion is the date established in the Agreement and certified by the Architect in accordance with Paragraph 9.8.

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

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

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Owner and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic’s liens and other security interests.
8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

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

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

ARTICLE 9 PAYMENT AND COMPLETION
9.1 CONTRACT SUM
9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

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

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

9.3.1.1 As provided in Subparagraph 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

9.3.1.2 Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

9.3.2 Unless otherwise provided in the Contract Documents, payment shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.
9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.3.4 No payment under this Article 9 shall be considered due until the Contractor delivers to the Architect properly executed, unconditional waivers of lien for the immediately prior pay period from the Contractor and every Subcontractor with a subcontract over $25,000, that performed work or supplied material within the scope of the Work for which the Contractor seeks payment. These lien waivers will be in a form that complies fully with the law of the State where the Project is located.

9.3.5 The Contractor agrees that absent such properly executed lien waivers, the Owner may elect at its sole option may withhold from payment an amount that the Owner or Architect reasonably estimates to be sufficient to satisfy the claims’ of the Subcontractors for which required lien waivers were not provided, until such lien waivers are provided.

9.3.6 The rights of the Owner under this Paragraph 9.3 shall not give rise to any duty on the part of the Owner to exercise such rights for the benefit of the Contractor or for any other person or entity.

9.4 CERTIFICATES FOR PAYMENT

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

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

9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

.1 defective Work not remedied;

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

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

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

.5 damage to the Owner or another contractor;

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

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

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

9.6 PROGRESS PAYMENTS

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the
manner and within the time provided in the Contract Documents, and shall so notify the Architect.

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

9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding
percentages of completion or amounts applied for by the Contractor and action taken thereon by the
Architect and Owner on account of portions of the Work done by such Subcontractor.

9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of
money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to material suppliers shall be treated in manner similar to that provided in
Subparagraphs 9.6.2, 9.6.3 and 9.6.4.

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

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

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

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

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

9.8.3 Upon receipt of the Contractor’s list, the Architect will make an inspection to determine
whether the Work or designated portion thereof is substantially complete. If the Architect’s
inspection discloses any item, whether or not included on the Contractor’s list, which is not
sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or
utilize the Work or designated portion thereof for its intended use, the Contractor shall, before
issuance of the Certificate of Substantial Completion, complete or correct such item upon
notification by the Architect. In such case, the Contractor shall then submit a request for another
inspection by the Architect to determine Substantial Completion.

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

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

9.9 PARTIAL OCCUPANCY OR USE
9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at
any stage when such portion is designated by separate agreement with the Contractor, provided such
occupancy or use is consented to by the insurer as required under Clause 11.4.1.5 and authorized by
public authorities having jurisdiction over the Work. Such partial occupancy or use may commence
whether or not the portion is substantially complete, provided the Owner and Contractor have
accepted in writing the responsibilities assigned to each of them for payments, retainage, if any,
security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

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

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys’ fees.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, made payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS
10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

10.2 SAFETY OF PERSONS AND PROPERTY
10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor’s Subcontractors or Sub-subcontractors; and
.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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

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

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

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of
them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor’s obligations under Paragraph 3.18.

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

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.3 HAZARDOUS MATERIALS

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

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

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

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

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

10.6 EMERGENCIES
10.6.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor’s discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS
11.1 CONTRACTOR'S LIABILITY INSURANCE
11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor’s operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers’ compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor’s employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor’s employees;

.4 claims for damages insured by usual personal injury liability coverage;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 claims for bodily injury or property damage arising out of completed operations; and

.8 claims involving contractual liability insurance applicable to the Contractor’s obligations under Paragraph 3.18.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

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

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE
11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor’s usual sources as primary coverage for the Owner’s, Contractor’s and Architect’s vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor’s Liability Insurance under Clauses 11.1.1.2 through 11.1.1.5.
11.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

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

11.4 PROPERTY INSURANCE

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

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

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

11.4.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles. 11.4.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

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

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

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

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

11.4.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.4.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 day’s prior written notice has been given to the Contractor.

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

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

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK
12.1 UNCOVERING OF WORK
12.1.1 If a portion of the Work is covered contrary to the Architect’s request or to requirements
specifically expressed in the Contract Documents, it must, if required in writing by the Architect,
be uncovered for the Architect’s examination and be replaced
at the Contractor’s expense without change in the Contract Time.

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

12.2 CORRECTION OF WORK
12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

12.2.1.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform
to the requirements of the Contract Documents, whether discovered before or after Substantial
Completion and whether or not fabricated, installed or completed.

Costs of correcting such rejected Work, including additional testing and inspections and
compensation for the Architect’s services
and expenses made necessary thereby, shall be at the Contractor’s expense.

12.2.2 AFTER SUBSTANTIAL COMPLETION
12.2.2.1 In addition to the Contractor’s obligations under Paragraph 3.5, if, within [one year] after
the date of Substantial Completion of the Work or designated portion thereof or after the date for
commencement of warranties established under Subparagraph 9.9.1, or by terms of other warranties
required by the Contract Documents, any of the Work is found to be not in accordance with the
requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of
written notice from the Owner to do so unless the Owner has previously given the Contractor a
written acceptance of such condition. The Owner shall give such notice promptly after discovery of
the condition. During the [one-year] period for correction of Work, if the Owner fails to notify the
Contractor and give the Contractor an opportunity to make the correction, the Owner waives the
rights to require correction by the Contractor and to make a claim for breach of warranty. If the
Contractor fails to correct nonconforming Work within a reasonable time during that period after
receipt of notice from the Owner or Architect, the Owner may correct it in accordance with
Paragraph 2.4.
12.2.3 The [one-year] period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this paragraph 12.2.

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

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

12.2.5 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the [one-year] period for correction of Work as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to the Contractor’s obligations other than specifically to correct the Work.

12.2.6 Contractor agrees that for the [twelve (12) month] period after the date of Substantial Completion of the Work, Contractor shall assign an experienced representative to work directly with Owner’s representatives to address and correct, any punchlist or warranty item identified from time to time by the Owner or the Architect. Owner shall incur no charge or expense for Contractor’s completion of punchlist or warranty work; and Contractor acknowledges that all costs for its punchlist and warranty work obligation are included within the Contract Price. Nothing in this Agreement shall require Contractor to correct any Work if such corrections would be economically wasteful when compared to the diminution in value of the Work resulting from the nonconformity and in such case Contractor may elect to pay Owner the amount of the diminution in value resulting from the nonconformity.

12.2.7 One (1) month before expiration of the Contractor’s [one-year] warranty, Contractor shall schedule a joint inspection of the Project. The Architect will inspect the Project to determine whether any warranty items are in need of correction and/or repair. The Architect will prepare a list of any such deficiencies or items and forward said list to the Contractor for correction and completion. Contractor shall notify the Architect upon completion of all corrective work; and Contractor and Architect shall perform a follow-up inspection to confirm that all Work has been completed in accordance with the Contract Documents.

12.3 ACCEPTANCE OF NONCONFORMING WORK
12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS
13.1 GOVERNING LAW
13.1.1 The Contract shall be governed by the law of the place where the Project is located.

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

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

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

13.4 RIGHTS AND REMEDIES
13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

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

13.5 TESTS AND INSPECTIONS
13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, the Owner and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear all costs of tests, inspections or approvals.

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

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

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

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

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

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

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

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

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

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT
14.1 TERMINATION BY THE CONTRACTOR
14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;
.2 an act of government, such as a declaration of national emergency which requires all Work to be stopped;
.3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
.4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable evidence as required by Subparagraph 2.2.1.

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

14.1.3 If one of the reasons described in Subparagraph 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days’ written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment,
tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

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

14.2 TERMINATION BY THE OWNER FOR CAUSE
14.2.1 The Owner may terminate the Contract if the Contractor:

.1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 persistently disregards laws, ordinances or rules, regulations or orders of a public authority having jurisdiction; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

.1 take possession of the site and of all materials, equipment, tolls and construction equipment not owned by the Contractor;

.2 accept assignment of subcontracts pursuant to Paragraph 5.4; and

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

14.2.3 In the event of termination of this Contract as provided in Subparagraph 13.2.1.3, Contractor shall receive no further payment until such time as the Work is completed and finally accepted.

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

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

14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Paragraph 14.3.1. This Adjustment of the Contract Sum shall include a reasonable profit margin for Contractor. No adjustment shall be made to the extent:
.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
.2 that an equitable adjustment is made or denied under another provision of the Contract.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

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

14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for all Work executed prior to the date of termination, and costs incurred by reason of such termination, along with all overhead and profit on the Work not executed. In case of such termination for the Owner’s convenience prior to the issuance of the second notice to proceed, the Contractor shall be entitled to receive payment for all Work executed prior to the date of termination, and costs incurred by reason of such termination.
AIA DOCUMENT G702, APPLICATION AND CERTIFICATE FOR PAYMENT
containing CONTRACTOR'S signed Certification is attached.

**Jurisdiction:**

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Santa Fe Community Living SL (Senda Lane) Site

The Senda Lane project is located on the South side of Santa Fe near Lopez Lane and Rufina Street. This scope of work for this project consists of a moderately renovating 24 three bedroom, one story duplex units that range in size from 1021-1040 square feet. Each unit will have a new kitchen, bathroom, and mechanical system. The interior and exterior surfaces will be painted and stained. Stucco will be patched as necessary and windows and doors will be re-secured on an as-need basis. We will also repair sidewalks and driveways as well as adding new utility/trash enclosures at each unit.

Existing residential buildings are constructed slab on grade with 6” wood frame. Existing roofs are constructed with joists, sheathed with plywood and enclosed with asphalt roofing.

Site work is included in the scope: Repairing sidewalks and driveways and adding new utility/trash enclosures to each unit.

> 50% of the residential units are visitable per MFA requirements.

The project will be designed in accordance with all local building code and zoning requirements, MFA Low Income Housing Tax Credit requirements, Energy Star requirements, Fair Housing requirements, and any other applicable potential subsidy program regulations except as noted in explanation letter.

There will be 24 units contained within 12 existing buildings:

Gross project square footage = 24,390 SF (HUD GROSS)
A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract.
      Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Schedule of monetary amounts of allowances in Contract Sum for designated products or services.
   b) Costs in Contract Sum other than in Allowances.
   c) Procedures for administration of Allowances.

3. SCHEDULE OF ALLOWANCES
   a) Not allowed without Owner approval.

4. COSTS INCLUDED IN ALLOWANCES
   a) Cost of product to Contractor or subcontractor, less applicable trade discounts.
   b) Delivery to site.
   c) Labor required under allowance, only when labor is specified to be included.
   d) Applicable taxes.
   e) All testing laboratory services.

5. CONTRACTOR COSTS INCLUDED IN CONTRACT SUM
   a) Products handling at site, including unloading, uncrating, and storage.
   b) Protection of products from elements and from damage.
   c) Labor for installation and finishing.
   d) Other expenses required to complete installation.

6. ADJUSTMENT OF COSTS
   a) Should the net cost be more or less than the specified amount of the allowance, the Contract Sum
      will be adjusted accordingly by Change Order.
   b) Submit any claims for anticipated additional costs at the site, or other expenses caused by the
      selection under the allowance, prior to execution of the Work.
   c) Submit documentation for actual additional costs at the site, or other expenses caused by the
      selection under the allowance, prior to execution of the Work.
   d) Failure to submit claims within the designated time will constitute a waiver of claims for additional
      costs.

7. CONTRACTOR RESPONSIBILITIES
   a) Assist Owner's Representative in determining suppliers; and installers; obtain proposal when
      requested.
   b) Make recommendations for Owner's Representative's consideration.
   c) Promptly notify Owner's Representative of any reasonable objections against supplier or installer.
   d) On notification of selection execute purchase agreement with designated supplier and installer.
   e) Arrange for and process product data and samples.
   f) Arrange for delivery. Promptly inspect products upon delivery for completeness, damage, and
      defects. Submit claims for transportation damage.
   g) Install, adjust, and finish products.
   h) Provide warranties for products and installation.

8. CORRELATION WITH CONTRACTOR SUBMITTALS
   a) Schedule shop drawings, product data, samples, and delivery dates, in Progress Schedule for
      products selected under allowances.

9. CASH ALLOWANCES
   a) Cerro Encantado $50,000
      Hopewell Mann $35,000
      Gallegos $17,500
      Senda $10,000
      Agua Fria $5,000
SECTION 01 25 00 - PRODUCT OPTIONS AND SUBSTITUTIONS

A. PART 1 GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. REQUIREMENTS INCLUDED
   a) Contractor’s options in selection of products.
   b) Products list.
   c) Requests for substitution of products.
   d) Value engineered items.

3. OPTIONS
   a) Products Specified by Reference Standards or by Description Only: Any product meeting those standards.
   b) Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named within time frame specified herein.

4. PRODUCTS LIST ON SUBSTITUTION
   a) Transmit three copies of a list of major products which are proposed for installation, including name of manufacturer.
   b) Tabulate products by Specifications section number, title, and Article number.
   c) For products specified only by reference standards, give manufacturer, trade name, model catalog designation, and reference standards.
   d) Owner's Representative will reply in writing within fifteen days stating whether there is a reasonable objection to listed items. Failure to object to a listed item shall not constitute a waiver of requirements of Contract Documents.

5. LIMITATIONS ON SUBSTITUTIONS
   a) Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request, when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.
   b) Substitute products shall not be ordered or installed without written acceptance.
   c) Only one request for substitution for each product will be considered. When substitution is not accepted, provide specified product.
   d) Owner's Representative will determine acceptability of substitutions.

6. REQUESTS FOR SUBSTITUTIONS
   a) Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents. Utilize substitution request form attached.
   b) Identify product by Specifications section and Article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
   c) Attach product data as specified in Section 01 33 00 - Submittals.
   d) Give cost data comparing proposed substitution with specified product.
   e) List availability of maintenance services, and replacement material.
   f) State effect of substitution on construction schedule, and changes required in other work or products.

7. CONTRACTOR REPRESENTATION
   a) Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product and that the cost reduction offered
is ample justification for accepting the offered substitution.

b) Contractor will provide same warranty for substitution as for specified product.
c) Contractor will coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.
d) Contractor certifies that cost data presented is complete and includes all related costs under this Contract.

8. SUBMITTAL PROCEDURES
   a) Submit three (3) copies of request for substitution.
b) Owner's Representative will review Contractor's requests for substitutions with reasonable promptness.
c) During the bidding period, Owner's Representative will record acceptable substitutions in Addenda.
d) After award of Contract, Owner's Representative will notify Contractor in writing of decision to accept or reject requested substitution, generally within fifteen working days.
e) For accepted products, shop drawings, product data, and samples shall be submitted under provisions of Section 01 33 00- Submittals.

END OF SECTION 01 25 00 - PRODUCT OPTIONS AND SUBSTITUTIONS
SUBSTITUTION REQUEST FORM (Contractor may supply their own form for substitutions for approval by owner’s representative prior to contract.)

SUBSTITUTION REQUEST

DATE: _______________________

ARCHITECT’S PROJECT NO: __________________

PROJECT: ____________________________________________

TO:

FROM: _____________________________________________

Contractor (Bidder) hereby requests acceptance of the following product or system as substitution in accordance with provisions of Section 01 25 00 of the Specifications:

1. SPECIFIED PRODUCT OR SYSTEM:
   Substitution request for: ________________________________
   Specification Section No.: ____________________________ Article: ______

2. SUPPORTING DATA:
   Product data adequate for evaluation of the request for proposed substitution is attached (description of product, reference standard, performance and test data, specifications, drawings, photographs.)
   Sample is attached.
   Sample will be sent if requested.

3. QUALITY COMPARISON
   SPECIFIED PRODUCT SUBSTITUTION
   Name, Brand: ____________________________
   Catalog No.: ____________________________
   Manufacturer: ____________________________
   Vendor: ____________________________
   Significant Variations: ____________________________

(Add Additional Sheets if Necessary)

4. Maintenance Service Available?: Yes ______  No ______
   Spare Parts Source: ____________________________
   Warranty Provided?: Yes ______  No ______ Years ______
   By Whom?: ____________________________

5. REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS:
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

6. EFFECT OF SUBSTITUTION:
   Does the proposed substitution affect other work (adverse or otherwise):
   No ______  Yes ______ (if yes, explain)
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   Substitution Changes Contract Time: No ______  Yes ______
   Add/Deduct _______ Days
   Substitution requires dimensional revisions or redesign of the work: No ____ Yes _____
   (if yes, attach explanation data)
   Saving of credit to Owner: $______________________________
   Extra Cost to Owner: $______________________________
7. CONTRACTOR’S (BIDDER’S) STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT DOCUMENTS:
I/we have investigated the proposed substitution. I/we:
believe that it is equal or superior in all respects including function, appearance and quality to specified product, except as stated above;
will provide same warranty and servicing requirements as specified for specific product; have included complete cost data and implications of the substitution;
will pay for changes to the building design and special inspection costs caused by the use of this product;
will coordinate the incorporation of the proposed substitution in the work.

CONTRACTOR (Bidder): ____________________________________________
Date: ____________ By: ____________________________________________

Answer all questions and complete all blanks - use "NA" if not applicable. Unresponsive or incomplete requests will be rejected.

Architectural’s REVIEW AND ACTION:

Resubmit substitution request
Provide more information in the following areas:
____________________________________________________________________________
____________________________________________________________________________

Sign Contractor’s (Bidder’s) Statement of Conformance
Substitution is accepted
Substitution is accepted, with the following comments:
____________________________________________________________________________
____________________________________________________________________________

Substitution rejected
Substitution Request received too late

__________________________________ Date: ______________________

Owner’s Representative
SECTION 01 26 63 - CHANGE ORDER PROCEDURES

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Procedures for processing Change Orders.

3. SUBMITTALS
   a) Preliminary Change Order Request (PCOR) with substantiating back-up.
   b) Change Order (CO).

4. DOCUMENTATION OF CHANGE IN CONTRACT SUM OR CONTRACT TIME
   a) Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.
   b) Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
   c) Provide additional data to support computations.
      (1) Quantities of products, labor, and equipment.
      (2) Taxes, insurances and bonds.
      (3) General Conditions and Fee (only when applicable).
      (4) Schedule comparisons to show justification for any change in Contract Time.
      (5) Credit for deletions from Contract, similarly documented.
   d) Support each claim for additional costs, and for work done on a time and material basis, with additional information.
      (1) Origin and date of claim.
      (2) Dates and times work was performed, and by whom.
      (3) Time records and wage rates paid.
      (4) Invoices and receipts for products, equipment, and subcontracts, similarly documented.

5. PRELIMINARY PROCEDURES
   a) Owner's Representative may submit a Request for Pricing (RFP) or a Construction Directive (CD) which includes: Statement for the reason for the change, detailed description of change with supplementary or revised Drawings and Specifications, the project time for executing the change, and the period of time during which the requested price will be considered valid.

6. CHANGE PROCEDURES
   a) Preliminary Change Order Request (PCOR):
      (1) For General Contractor to use to estimate cost of change and receive authorization to proceed.
      (2) Form explanation:
         (a) Item #1: Give a detailed description of the change in Scope of Work.
         (b) Item #2: Indicate the name of the form that initiated the PCOR.
         (c) Item #3: Indicate the estimated cost for change in Scope of Work within a range of +/- 5%. If there is no cost impact, enter "0".
         (d) Item #4: The number of added days the change in Scope of Work will cause. If there is no time impact, enter "0".
         (e) Item #5: This signature line is used if work is already detailed in plans or specs.
         (f) Item #6: This signature line is used to expedite work in progress. When signed, General Contractor is to proceed immediately with the work, and is to prepare a Change Order with pricing documentation for approval.
         (g) Item #7: This signature line is used if a total cost rather than an estimate is required to make a decision. When signed, advises the General Contractor Not to Proceed with the Work, but to prepare a Change Order with pricing documentation for the Owner's approval.
      (3) General Contractor distribution:
         (a) Copy to SFCHA within five (5) days of known cost impact.
         (b) Thomas Gifford Architect
   b) Preliminary Change Order Request Tracking Log (PCORTL):
      (1) To be maintained by General Contractor Project Officer.
      (2) To be kept current and furnish an updated copy at each job meeting:
         (a) SFCHA
(b) Thomas Gifford
(c) Change Orders

(1) The Change Order shall have a copy of the Construction Directive and/or PCOR attached, along with all backup necessary to substantiate the requested change.
(2) The Change Order will be directed to SFCHA for signature.

d) Change Order Tracking Log (COTL):
(1) To be maintained by General Contractor Project Manager.
(2) Copy monthly or more often, if necessary.

7. CORRELATION OF CONTRACTOR SUBMITTALS
   a) Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order, adjust the Contract Sum as shown on Change Order.
   b) Promptly revise Progress Schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
   c) Promptly enter changes in Project Record Documents.

END OF SECTION 01 26 63 - CHANGE ORDER PROCEDURES
SECTION 01 31 00 - Project Management and Coordination

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplemental General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SUMMARY
   a) This section shall not be interpreted to relieve Contractor of his sole responsibility for supervision and coordination of all construction procedures as provided herein and in Contract Conditions.
   b) Provisions of this section are considered minimal for orderly and expeditious prosecution of Work.
   c) It is intent of Owner to complete Project on a building basis. Coordinate efforts of all Work on Project in manner to accomplish completed units including occupancy permits on this basis. Date of Completion and Final Acceptance are based by building.
   d) Related Sections
      (1) Section 01 31 00: Submittals
      (2) Section 01 32 16: Progress Schedules
      (3) Section 01 29 83: Testing Laboratory Services
      (4) Section 01 25 00: Product Options and Substitutions
      (5) Section 01 77 00: Contract Closeout
      (6) Section 01 74 00: Cleaning Up

3. ORDERING PRODUCTS
   a) Before ordering materials, equipment, custom or standard fabricated items, verify the following provisions:
      (1) Each item complies with Contract Documents
      (2) Each properly related to Work already completed
      (3) Shop drawings or others submittal confirm "1." and "2." above, and are approved by owner
      (4) Orders are placed and delivery dates are established allowing orderly execution of Work on schedule and not allowing untimely delivery of critically sensitive products before Project site conditions are satisfactory to receive them.

4. COORDINATION AMONG TRADES
   a) Initiate coordinating procedures at Project meetings before Work in field begins. Resolve scheduling, sequencing, interferences, and priorities of oncoming simultaneous Work among interested parties to achieve specified results, and to advance planned progress of Project.
   b) Continue coordinating procedures by actively controlling Project conditions as follows:
      (1) Verify products of all trades are stored in orderly fashion under conditions complying with manufacturer's instructions or specific requirements of relevant specification section whichever requirement is more stringent at planned locations.
      (2) Verify compliance of environmental conditions before, during, and after execution of Work, with manufacturer's instructions and specific requirements of relevant sections of these specifications.
      (3) Verify adherence to specified tolerances as Work progresses.
      (4) Inspect job conditions before one trade follows another.
   c) Continue coordinating effort as Work progresses. Make adjustments in planned procedures as changing job conditions require to achieve results specified and to best advance progress of Work. Immediately advise all parties involved including owner of required changes in construction schedule and planned procedure.

5. COORDINATION WITH RELATED WORK
   a) Require all trades to cooperate with related Work.
   b) Contractor and his subcontractors shall coordinate Work with separate contract work by Owner, if applicable, and with prior occupancy provisions required by Owner.

6. TRAFFIC MAINTENANCE AND CIRCULATION
   a) General
      (1) Maintain circulation of traffic, both pedestrian and vehicular, and access to all parts of site by fire-fighting apparatus during construction.
      (2) Access to site is from public streets. Confining parking and vehicle access as directed by Owner's Representative to accommodate operation of adjoining businesses and residences.
      (3) Access to occupied areas will be restricted during construction unless prior approval is obtained from Owner's Representative.

B. PART 2: PRODUCTS
   a) Not applicable to this Section.

C. PART 3: EXECUTION
   a) Not applicable to this Section.

End of Section 01 31 00 - Project Management and Coordination
SECTION 01 31 19 - PROGRESS MEETINGS

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Scheduling and administration of progress meetings.
   b) Pre-installation conferences.

3. Owner's PROGRESS MEETINGS
   a) The Contractor and Owner's Representative will jointly schedule and administer regular weekly (minimum) or as requested by Owner, progress meetings, throughout progress of Work. Contractor will prepare agenda, and distribute notice of each meeting to participants.
   b) Contractor shall make physical arrangements.
   c) Contractor will preside at meetings.
   d) Location of Meetings: Contractor's field office.
   e) Attendance: Project Manager, job superintendent, subcontractors/suppliers as appropriate to agenda. Owner's Representative and professional consultants as appropriate.
   f) Anticipated Agenda.
      (1) Review compliance with safety standards.
      (2) Discuss compliance of project cleanliness.
      (3) Review of Work progress.
      (4) Field Observations, problems, and decisions.
      (5) Identification of problems which impede planned progress.
      (6) Review of Submittals schedule and status of submittals. Refer to Section 01 33 00 - Submittals.
      (7) Review of off-site fabrication and delivery schedule.
      (8) Maintenance of progress schedule. Refer to Section 01 32 16 - Progress Schedules.
      (9) Corrective measures to regain project schedules.
      (10) Planned progress during succeeding work period.
      (11) Coordination of project progress.
      (12) Maintenance of quality and work standards.
      (13) Discussion of any outstanding Request for Pricing (RFP), Construction Directives (CD), Request for Information (RFI), Preliminary Change Order Requests (PCOR), or Change Orders (CO).
      (14) Issue Request for Information Tracking Log (RFITL), Preliminary Change Order Request Tracking Log (PCORTL), or Change Order Tracking Log (COTL), as needed.
      (15) Effect of proposed changes on progress schedule and coordination.
      (16) Other business relating to Work.
   g) Contractor will record and distribute minutes of each meeting to all parties within three (3) work days.

4. Subcontractor progress meetings
   a) The Contractor will schedule and administer regular construction progress meetings, throughout progress of Work. He will prepare agenda, and distribute notice of each meeting to participants.
   b) Contractor shall make physical arrangements.
   c) Contractor will preside at meetings.
   d) Location of Meetings: Contractor's field office.
   e) Attendance: Project Manager, job superintendent, subcontractors/suppliers as appropriate to agenda.
   f) Anticipated Agenda.
      (1) Review of Work progress.
      (2) Field Observations, problems, and decisions.
      (3) Identification of problems which impede planned progress.
      (4) Review of Submittals schedule and status of submittals. Refer to Section 01 31 00 - Submittals for submittal's log.
      (5) Review of off-site fabrication and delivery schedule.
      (6) Maintenance of progress schedule. Refer to Section 01 32 16 - Progress Schedules.
      (7) Corrective measures to regain project schedules.
      (8) Planned progress during succeeding work period.
      (9) Coordination of project progress.
(10) Maintenance of quality and work standards.
(11) Effect of proposed changes on progress schedule and coordination.
(12) Other business relating to Work.

g) Contractor will record and distribute minutes of each meeting to all parties within three (3) work
days of next progress meeting.

5. Subcontractor pre-installation conferences
   a) As required by specific specification Sections, convene a pre-construction conference at work
      site prior to commencing work of the Section.
   b) Require attendance of entities directly affecting, or affected by, work of the Section.
   c) Prepare agenda and preside at conference.
   d) Review conditions of installation, preparation and installation procedures, and coordination with
      related work.
   e) Coordinate with Owner for timing so that Owner's Representative may be present.
   f) Contractor will record and distribute minutes of each meeting to all affected parties and Owner's
      Representative within three (3) work days.
   g) Submit Schedule of Pre-construction Conferences within thirty (30) days of Notice to Proceed.

B. PART 2: PRODUCTS
   a) Not applicable to this section.

C. PART 3: EXECUTION
   a) Not applicable to this section.

END OF SECTION 01 31 19 - PROGRESS MEETINGS
SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Procedures for preparation and submittal of construction Progress Schedules.

3. FORMAT
   a) Prepare schedule as approved by the Owner's Representative.
      (1) An activity for each G703 line item.
      (2) Milestone for each rough and final inspection.
      (3) Milestone for temporary certificate of occupancy and certificate of occupancy.
      (4) Milestone for Owner's acceptance and turnover.
      (5) Activity for punchlist correction both for contractor's and Owner's punchlist.

4. CONTENT
   a) Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

5. REVISIONS TO SCHEDULES (Bi-MONTHLY)
   a) Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   b) Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
   c) Provide narrative report to define problem areas, anticipated delays, actual delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

6. SUBMITTALS
   a) Submit initial Schedules with bidding documents.
   b) Submit revised Progress Schedules at each job meeting and with each Application for Payment.
   c) Distribution: One (1) copy each to Owner's Representative, field office at project site, and inspecting consultant.

7. DISTRIBUTION
   a) Distribute copies of reviewed Schedules to job site file, subcontractors, suppliers, and other concerned entities.
   b) Instruct recipients to promptly report, in writing, problems anticipated by projections in Schedules.

B. PART 2: PRODUCTS
   a) Not applicable to this section.

C. PART 3: EXECUTION
   a) Not applicable to this section.

END OF SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION
SECTION 01 32 21 - OWNER PRE-CONSTRUCTION CONFERENCE

A. PART 1 - GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Contractor participation in pre-construction conferences.

3. PRECONSTRUCTION CONFERENCE
   a) Owner's Representative will schedule conference within 15 days after Notice to Proceed.
   b) Attendance: Owner's Representative and General Contractor to include principal, project manager, and superintendent.
   c) Agenda
      (1) Submit list of:
          (a) Subcontractors
          (b) List of products
          (c) Schedule of values
          (d) Progress schedule
          (e) Submittal schedule.
      (2) Designation of responsible personnel (should be in attendance).
      (3) Procedures and processing of:
          (a) Field Decisions
          (b) Submittals And Submittal Log
          (c) Substitutions
          (d) Applications For Payment
          (e) Requests For Pricing
          (f) Change Orders And Log
          (g) Preliminary Change Orders Request And Log
          (h) Requests For Information And Log
          (i) Contract Closeout Procedures
          (j) SK Drawings And Logs
      (4) Scheduling
      (5) Use of premises by Owner and Contractor
      (6) Owner's requirements
      (7) Temporary facilities
      (8) Safety program including, but not limited to, fall protection
      (9) Procedures for maintaining Material Safety Data Standards (MSDS) documents
      (10) Survey and building layout
      (11) Security and housekeeping procedures
      (12) Schedules
      (13) Procedures for testing
      (14) Procedures for maintaining record documents
      (15) Turnover procedures
      (16) Closeout procedures
      (17) Project Meetings
          (a) Agenda
          (b) Minutes
      (18) Mock-ups

B. PART 2: PRODUCTS
   a) Not applicable to this Section

C. PART 3: EXECUTION
   a) Not applicable to this Section

END OF SECTION 01 32 13 - OWNER PRECONSTRUCTION CONFERENCE
SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.
4. Periodic construction video recordings.
5. Web-based construction photographic documentation.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
3. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1. Digital Camera: Minimum sensor resolution of 8 megapixels.
2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
3. Identification: Provide the following information with each image description in file metadata tag:
   a. Name of Project.
   b. Name and contact information for photographer.
   c. Name of Architect.
   d. Name of Contractor.
   e. Date photograph was taken.
   f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
   g. Unique sequential identifier keyed to accompanying key plan.

1.4 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor resolution of 8 megapixels.
size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

B. Digital Video Recordings: Provide high-resolution, digital video disc in format acceptable to Architect.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect and Construction Manager.

C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
2. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take 20 photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

1. Vantage Points: Following suggestions by Architect and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:
   a. Commencement of the Work, through completion of subgrade construction.
   b. Above-grade structural framing.
   c. Exterior building enclosure.
   d. Interior Work, through date of Substantial Completion.

E. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect will inform photographer of desired vantage points.

1. Do not include date stamp.

F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:
   a. Special events planned at Project site.
   b. Immediate follow-up when on-site events result in construction damage or losses.
   c. Photographs to be taken at fabrication locations away from Project site.
   d. Substantial Completion of a major phase or component of the Work.
   e. Extra record photographs at time of final acceptance.

3.2 CONSTRUCTION VIDEO RECORDINGS

A. Video Recording Photographer: Engage a qualified videographer to record construction video
recordings.

B. Recording: Mount camera on tripod before starting recording unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.

C. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
   1. Confirm date and time at beginning and end of recording.
   2. Begin each video recording with name of Project, Contractor's name, videographer's name, and Project location.

D. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from video recording opposite the corresponding narration segment.

END OF SECTION 01 32 33 PHOTOGRAPHIC DOCUMENTATION
SECTION 01 33 00 - SUBMITTALS

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
   b) Reference Section 01 25 00 - Product Options and Substitutions, for substitutions and National Purchase Agreements.

2. SUMMARY
   a) General Provisions
      (1) Provisions in this section are mandatory procedures for preparing and submitting samples, shop drawings, and product data.
      (2) Job delays occasioned by requirement of resubmission of samples, shop drawings, and product data not in accord with Contract Documents are Contractor's responsibility, and will not be considered valid justification for extension of time.
   b) Submittal Log:
      (1) Contractor to complete attached submittals log and submit proposed submittal schedule to Owner's Representative for review within fifteen calendar days following Notice to Proceed.
      (2) Schedule purpose is to:
         (a) Demonstrate that submittals, shop drawings, data, samples and mock-ups required for Work are addressed by Contractor.
         (b) Demonstrate consistency with Contractor's proposed Progress Schedule.
         (c) Assist Owner's Representative in scheduling timely review/approval action of submittals.
      (3) Schedule contents: Description of submitted item, proposed date of submittal or availability for review by Owner's Representative and proposed date of requested return by Owner's Representative, allowing twenty work days for Owner Processing.
      (4) Within fifteen calendar days after Owner's Representative receipt of submittal schedule, Owner's Representative and Contractor shall jointly review schedule and mutually agree to acceptability or necessary modifications.
      (5) Submit accepted schedule within ten calendar days after joint review date.

3. MOCK-UPS - ALL SYSTEMS
   a) Furnish and install "Z" shaped mock-up depicting building inside and outside corner which includes but is not limited to the following systems:
      (1) Framing.
      (2) Sheathing.
      (3) Stucco and accessories.
      (4) Roofing.
      (5) Painting.
      (6) Window / door frames.
   b) Mock-ups to remain on-site until final project completion.
   c) Accepted mock-ups to represent standard of quality for the project.
   d) Mock-ups to be approved by Owner's Representative prior to commencement of building construction.

4. SAMPLE PREPARATION
   a) Prepare samples in sizes, shapes, and finishes in accord with provisions of individual specification sections.
   b) Samples furnished under this section are not to be confused with full size, on-the-site "Mock-Ups" called for in some specification sections.
   c) Number of samples submitted: Three (3): Two (2) required by Contractors, plus one (1) which will be retained by Owner, unless otherwise indicated.
   d) Samples Requiring Color Selection
      (1) Submit at earliest practical time.
      (2) No color selections will be made until all colors can be chosen and issued at one time in form of color schedule.
      (3) Approvals and color selections will not be made unilaterally where samples or selections regarding adjacent materials must be made for aesthetic purposes.

5. SHOP DRAWING PREPARATION
   a) Conform to the Following Requirements
      (1) Number sheets consecutively.
      (2) Indicate working and erection dimensions and relationships to adjacent work.
Concurrent submittals of different aspects of work may be required by Owner's Representative as deemed necessary to demonstrate Contractor's ability to understand these relationships and coordinate Work.

(3) Indicate:
   (a) Arrangements and section views, as applicable.
   (b) Material, gauges, thicknesses, finishes, and characteristics.
   (c) Anchoring and fastening details: include information for making connections to adjacent work.

(4) Provide 3" by 3" clean space in the lower right hand area for entry of the Contractor's and the Architecturals stamp.

(5) Cross-reference drawing details and specification paragraphs applicable to submitted data.

   b) Submit blue line copies of shop drawings. Provide copies as follows:
      (1) Number required by Contractor for coordination and execution of Work.
      (2) Two (2) copies for Owner, and Owner Representative's files.
      (3) Copies retained by Architect as follows:
         (a) Work designed by engineers or other consultants -- two copies.
         (b) All other work -- one copy.

6. PRODUCT DATA PREPARATION
   a) Include product manufacturer's standard printed material, dated, with product description and installation instructions indicated: delete data not related to this Project or mark "VOID" as applicable.
   b) Number of copies submitted: Number required by Contractor plus two which will be retained by Owner's Representative, and one (1) copy per reviewing architect/engineer consultant.

7. CONTRACTOR'S REVIEW
   a) Review submittals and stamp with approval action stamp containing Contractor's name, work "Approved", signed initials of approving agent, date of approval action, review notes, comments, and corrections required prior to submission to Owner's Representative. By so noting, Contractor indicates that he has reviewed and approved materials, equipment, quantities, and field verified dimensions represented by particular submittal.
   b) Contractor represents by submitting samples, shop drawings, and product data that he has complied with provisions specified above. Submissions made without Contractor's approval indicated thereon will be returned without being reviewed for compliance with this requirement.
   c) Date each submittal indicating name of Project, Architect, Engineer, Contractor, Subcontractor, as applicable description or name of equipment, material, or product and identify Work use location.
   d) Accompany submittal with transmittal letter containing project name, Contractor's name, number of samples or drawings, titles, and other pertinent data. Outline deviations, if any, in submittals from requirements of Contract Documents.

8. ARCHITECT'S REVIEW
   a) Review submittal with reasonable promptness to cause no delay in Work.
   b) Review is only for conformance with design concept of project and information in Contract Documents. Review of separate item shall not indicate approval of an assembly in which item functions.
   c) Architect will return submittals to Owner's Representative for distribution.

9. RESUBMISSION
   a) Make corrections and changes indicated for unapproved submittals -- resubmit in same manner as specified above until Architect's or Owner's approval is obtained.
   b) Direct specific attention to revisions other than corrections requested by Architect on previous submissions, if any, in resubmission transmittal.

10. DISTRIBUTION
    a) Contractor is responsible for obtaining and distributing copies of submittal to his Subcontractors and material suppliers.
    b) Maintain orderly file of all approved submittals bearing Architect's, Engineer's, or Owner's stamp for Project duration -- deliver to Owner's Representative as part of Project closeout documents.
SECTION 01 40 00 - QUALITY REQUIREMENTS

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Quality control of products and workmanship.
   b) Manufacturer's instructions, certificates and field services.
   c) Mockups and Field Samples.

3. DESCRIPTION
   a) Maintain quality control over supervision, subcontractors, suppliers, manufacturers, products, services workmanship, and site conditions, to produce Work in accordance with Contract Documents.

4. WORKMANSHIP
   a) Comply with industry standards of the region except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
   b) Provide suitably qualified personnel to produce Work of specified quality.
   c) Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
   d) Provide finishes to match approved samples.

5. MANUFACTURER'S INSTRUCTIONS AND CERTIFICATES
   a) Require compliance with instructions in full detail, including each step in sequence.
   b) Should instruction conflict with Contract Documents, request clarification from Owner's Representative before proceeding.
   c) When required in individual Specifications section, submit manufacturer's certificate, in duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer.

6. MANUFACTURER'S FIELD SERVICES
   a) When required by manufacturer for warranty validation, have manufacturer or his authorized representative provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment test, adjust, and balance of equipment as applicable, and to make written report of observations and recommendations to Owner's Representative.
   b) Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
   c) Submit report in duplicate within three (3) days of observation to Owner's Representative for review.

7. MOCKUPS / FIELD SAMPLES
   a) Assemble and erect mock-ups and field samples complete with specified attachment and anchorage devices, flashings, seals, and finishes.
   b) Acceptable mockups and field samples may be retained in completed Work.
   c) Install mock-ups and field samples at the site required by individual specifications Sections for review, or as directed by Owner's Representative.
   d) Acceptable samples represent a quality level for the Work.

B. PART 2: PRODUCTS
   a) Not applicable to this section.

C. PART 3: EXECUTION
   a) Not applicable to this section.

END OF SECTION 01 40 00 - QUALITY REQUIREMENTS
A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. REQUIREMENTS INCLUDED
   a) Applicability of Reference Standards.
   b) Provision of Reference Standards at site.

3. QUALITY ASSURANCE
   a) For products of workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
   b) The date of the standard is the most current edition that is in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.
   c) When required by individual Specifications section, obtain copy of standard. Maintain copy at job site during submittals, planning, and progress of the specific work, until Completion.

1. SCHEDULE OF REFERENCES
   AA Aluminum Association
   AAMA American Architectural Manufacturer's Association
   ACI American Concrete Institute
   AGA American Gas Association
   AHA American Hardboard Association
   AIA American Institute of Architects
   AISC American Institute of Steel Construction
   AISI American Iron and Steel Institute
   ALSC American Lumber Standards Committee
   ANSI American National Standards Institute
   APA American Plywood Association
   ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
   ASME American Society of Mechanical Engineers
   ASPA American Sod Producers Association ASPE
   ASPE American Society of Plumbing Engineers
   ASTM American Society for Testing and Materials
   AWWA American Water Works Association
   AWI Architectural Woodwork Institute
   AWPA American Wood-Preservers' Association
   AWPB American Wood Preservers Bureau
   AWS American Welding Society
   BHMA Builders Hardware Manufacturers Association
   CFF Code of Federal Regulations
   CISCA Ceiling and Interior Systems
   CPSC Consumer Product Safety Commission
   CRSI Concrete Reinforcing Steel Institute
   CTI Ceramic Tile Institute of America
   DHI Door and Hardware Institute
   EPA Environmental Protection Agency
   FGMA Flat Glass Marketing Association
   FM Factory Mutual Engineer "G" and Research
   FS Federal Specification
   GA Gypsum Association
   NAAMM National Association of Architectural Metal Manufacturers
   NECA National Electrical Contractors Association
   NEMA National Electrical Manufacturer's Association
   NFPA National Fire Protection Association
   NFPA National Forest Products Association
   NKCA National Kitchen Cabinet Association
   NPCA National Paint and Coatings Association
   NRCA National Roofing Contractors Association
   OSHA Occupational Safety and Health Administration
   PCA Portland Cement Association
   PDI Plumbing and Drainage Institute
PS  Product Standard
PTI  Post Tension Institute
SDI  Steel Door Institute
SIGMA  Sealed Insulating Glass Manufacturers Association
SMACNA  Sheet Metal and Air Conditioning Contractors National Association
SPIB  Southern Pine Inspection Bureau
SSPC  Steel Structures Painting Council
TCA  Tile Council of America, Inc.
UL  Underwriter's Laboratories, Inc.
UPC  Uniform Plumbing Code
WCLIB  West Coast Lumber Inspection Bureau
WWPA  Western Wood Products Association

A. PART 2: PRODUCTS
   a) Not applicable to this Section.

B. PART 3: EXECUTION
   a) Not applicable to this Section.

END OF SECTION 01 42 00 - REFERENCE STANDARDS
A. PART 1: GENERAL

1. SUMMARY
   a) Related Documents
   b) Provisions established within the General and Supplementary General Conditions of the Contract, Division I - General Requirements, and the Drawings collectively applicable to this Section.

2. SECTION INCLUDES
   a) Owner provided testing laboratory services.
   b) Selection and payment.
   c) Laboratory responsibilities.
   d) Laboratory reports.
   e) Limits on testing laboratory authority.
   f) Contractor responsibilities.
   g) Schedule of inspections and tests.

3. SELECTION AND PAYMENT
   a) Contractor will employ services of an independent testing laboratory to perform specified inspection and testing. Contractor will be paid by Owner.
   b) Employment of testing laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents. Contractor will pay all testing required by local authorities having jurisdiction.

4. LABORATORY RESPONSIBILITIES
   a) Test samples of mixes submitted by Contractor.
   b) Provide qualified personnel at site. Cooperate with Contractor and Inspecting A/E in the performance of services.
   c) Perform specified inspection, sampling and testing of products in accordance with specified standards.
   d) Ascertain compliance of materials and mixes with requirements of Contract Documents.
   e) Promptly notify Owner's Representative of observed irregularities or non-conformance of Work or product.
   f) Perform additional inspections and tests required by Owner's Representative.

5. LABORATORY REPORTS
   a) After each inspection and test, promptly submit one copy of laboratory report to Architect, Owner's Representative, applicable consultants, and to Contractor. Include: Date issued, Project title and number, name of inspector, date and time of sampling or inspection, identification of product and Specifications section, location in the Project, type of inspection or test, date of test, results of tests, and conformance with Contract Documents. When requested by Inspecting A/E, Engineer, Contractor, or Owner provide interpretation of test results.
   b) Make written recommendations of procedures to correct unforeseen conditions not addressed in soils reports.
   (1) Such recommendations must be approved in writing by Owner's Representative prior to implementation.

6. LIMITS ON TESTING LABORATORY AUTHORITY
   a) Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   b) Laboratory may not approve or accept any portion of the Work, unless approved by Owner's Representative.
   c) Laboratory may not assume any duties of Contractor.
   d) Laboratory has no authority to stop Work, unless otherwise approved by Owner's Representative.

7. CONTRACTOR RESPONSIBILITIES
   a) Provide adequate samples of materials proposed to be used which require testing, together with proposed mix designs.
   b) Cooperate with laboratory personnel, and provide access to Work and to manufacturer's facilities.
   c) Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.
   d) Notify laboratory of materials sources and furnish necessary quantities of representative samples of materials proposed for use which are required to be tested.
   e) Notify Owner's Representative and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
   f) Advise laboratory in a timely fashion to complete required inspection and testing prior to subsequent work being performed.
   g) Pay for all subsequent testing of products or systems found to be defective or otherwise not in accordance with specification requirements. Remove rejected products and replace with products of specified quality.

B. PART 2: PRODUCTS

A) Not applicable to this section.
C. PART 3: EXECUTION

1. EARTHWORK (SITE GENERAL)
   a) Make necessary soil tests (Atterberg Limit Series and ASTM D698 Standard Proctor) to determine
      moisture content and density of existing subgrade. Perform necessary soil tests (Atterberg Limit Series
      and ASTM D698 Standard Proctor for each type of fill specified) to determine the moisture content of
      existing subgrade and to inspect and test the placement of additional fill lifts to verify that all fill materials
      used are in accordance with the specifications for that use. Perform one field density test (ASTM D2922)
      per 10,000 S.F. of site area in the area affected on each lift prior to placement of additional fill material.

2. TRENCHING
   a) Make necessary soil compaction tests in all trenching.

3. PAVING SUBGRADE STABILIZATION
   a) Perform one subgrade in-place density test per 7,500 S.F. of subgrade, after subgrade preparation
      is complete at locations determined by the soils engineer, in accordance with ASTM D2922 and ASTM
      D3017. Perform tests within 48 hours of placement of pavement construction.

4. BUILDING SUBGRADE STABILIZATION
   a) Make necessary soils tests (Atterberg Limit Series and ASTM D698 Standard Proctor for each type
      of fill specified) to determine the moisture content and density of existing subgrade and inspect and test
      the placement of additional fill lifts to verify that all fill materials used are in accordance with the
      specifications for that use. Perform one field density test (ASTM D2922) for each 5,000 S.F. of area
      within the building footprint on each lift prior to placement of additional fill material.

5. FORMWORK, REINFORCING STEEL AND INSERTS
   a) Prior to each concrete pour, inspect formwork for tightness of joints, proper shoring and bracing, and
      beam size in accordance with ACI 347.
   b) Prior to each concrete pour, inspect fabrication and bending of bars, bar sizes, spacing, placement
      and tying to accordance with ACI 315.
   c) Prior to each concrete pour, inspect positioning of steel inserts, assemblies, sizes and spacing.

6. CAST-IN-PLACE CONCRETE
   a) Design Mixes
      (1) All concrete mixtures to be reviewed by the Design Engineer and/or the testing laboratory.
      (2) At the beginning of the work Contractor shall submit proposed concrete mixes, including test
      results, for review by the Owner's Representative and testing laboratory, including the sieve
      analysis of fine and course aggregate ASTM C-136, dry rodded weight of coarse aggregate -
      ASTM C-29, and the specific gravity (bulk saturated surface dry), of fine and coarse aggregates
      ASTM C127 and C128. Laboratory, Architectural, Contractor, and Owner's Representative will
      review and make mix modification recommendations.
      (3) Do not mix concrete for placing in the work until after laboratory reports reflect that each
      proposed mix will develop the strength required.
   b) Test Cylinders: Make at least one (1) test of each day's pouring of each one hundred (100) cu.
      yards, whichever comes first, for each type of concrete (1 per building, minimum for foundations; 1 per
      building, minimum for pea gravel hardrock), on each different portion or section of the work. Mold and
      cure specimens in accordance with ASTM C31, and test in accordance with ASTM C39. Test cylinders
      shall be made and tested by the laboratory in accordance with ASTM C 172. Footings, walls, and floor
      systems constitute different sections. Each test shall consist of four (4) specimens, one (1) of which
      shall be broken at seven (7) days, two (2) at twenty-eight (28) days and one held in reserve. Determine
      temperature and air content for each set of test cylinders in accordance with ASTM C231.
   c) Field Quality Control
      (1) Determine slump for each strength test and whenever consistency of concrete appears to vary,
      in accordance with ASTM C143.
      (2) Monitor addition of water to concrete and length of time concrete is allowed to remain in truck.
      (3) Notate and verify delivery tickets indicating class of concrete, time test was performed, truck
      ticket number, amount of water added during initial batching, time initial batching occurred, and
      location of each placement.
      (4) Monitor work being performed in accordance with ACI (American Concrete Institute)
      recommendations as a standard of quality.
      (5) Notify job superintendent of any non-conformance immediately and note on daily job report
      including how resolved.

END OF SECTION 01 45 23 - TESTING & INSPECTING SERVICES
A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Electricity, Lighting.
   b) Heat, Ventilation.
   c) Telephone Service.
   d) Water.
   e) Sanitary Facilities.
   f) Fire Protection.
   g) Barriers.
   h) Enclosures.
   i) Protection of Installed Work.
   j) Security.
   k) Water Control.
   l) Cleaning During Construction.
   m) Project Identification.
   n) Field Offices and Sheds.
   o) Access Roads and Temporary Parking.
   p) Scaffolding.
   q) Sedimentation and erosion control.

3. TEMPORARY ELECTRICITY
   a) Provide and pay for power service required from Utility source.
   b) Provide power outlets for construction operations. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting, and as required by authorities having jurisdiction, and in accordance with all grounding requirements.

4. TEMPORARY LIGHTING
   a) Provide and maintain appropriate incandescent lighting for construction operations and as required by authorities having jurisdiction.
   b) Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails and lamps as required.
   c) Maintain lighting and provide routine repairs.
   d) Permanent building lighting may be utilized during construction.

5. TEMPORARY HEAT
   a) Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.
   b) Use of permanent heating/cooling systems for temporary heating/cooling shall not affect the warranty period.
   c) Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
   d) Maintain appropriate ambient temperature in areas where construction is in progress, unless indicated otherwise in specifications.
   e) Fuel oil heaters of any kind are not permitted.

6. TEMPORARY VENTILATION
   a) Ventilate enclosed areas to assure cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

7. TEMPORARY TELEPHONE SERVICE
   a) Provide adequate, separate telephone service lines to field office for voice and data.

8. TEMPORARY WATER SERVICE
   a) Provide service required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses.
   b) All water shall be potable unless clearly marked otherwise.

9. TEMPORARY SANITARY FACILITIES
   a) Provide and maintain required facilities and enclosures.
      (1) Use of permanent new facilities by construction personnel is prohibited.

10. TEMPORARY FIRE PROTECTION
    a) Observe and enforce throughout the Work all requirements of City, State and Insurance authorities to minimize fire hazards.
    b) Remove combustible refuse from within each building daily.
    c) Provide fire extinguishers as required by the local fire department, city ordinances, and OSHA.
11. BARRIERS
   a) Provide as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
   b) Provide 6-foot high chain link fence around construction site and temporary construction staging area; equip with vehicular and pedestrian gates with locks on outside. Do not damage existing asphalt or paving. Contractor must confirm extent of fencing with Owner’s Representative prior to mobilization
   c) Provide barricades and covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.

12. ENCLOSURES
   a) Provide temporary weather-tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

13. PROTECTION OF INSTALLED WORK
   a) Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
   b) Provide protective coverings at walls, projections, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.
   c) Prohibit traffic & storage on waterproofed & roofed surfaces, on lawn and landscaped areas.

14. PARKING
   a) All parking shall be at temporary construction staging area.

15. WATER CONTROL
   a) Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment.
   b) Protect site from puddling or running water.

16. CLEANING DURING CONSTRUCTION
   a) Refer to Section 01 74 00 - Cleaning Up.

17. PROJECT IDENTIFICATION
   a) Provide only as required by authorities having jurisdiction.

18. FIELD OFFICES AND SHEDS
   a) Office: Weather-tight, with lighting, electrical outlets, telephone, heating, and air conditioning equipment, and equipped with minimum of one layout table, one desk, file cabinet, plan rack, conference table and chairs sufficient for progress meetings.
   b) Storage Container for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

19. SCAFFOLDING
   a) Type: Designed and installed by each contractor or subcontractor for his own use for work during construction. Conform to special requirements of respective trades that use scaffolding and applicable rules and regulations of local building codes and governing agencies, including OSHA’s fall protection program.
   b) Erect scaffolding independent of building walls: Arrange to avoid interference with other trades as much as possible.
   c) Remove scaffolding when no longer required.

20. SEDIMENTATION AND EROSION CONTROL
   a) Provide adequate silt fencing and/or hay bails as erosion control material per design build SWWPP. Extent of fencing shall be as indicated on plans or as necessary to prevent onsite and offsite erosion and sedimentation.

21. REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS
   a) Remove temporary materials, equipment, services, and construction prior to Completion inspection.
   b) Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2-feet; grade site as indicated. Restore existing facilities used during construction to specified, or to original, condition.

22. OSHA
   a) Workers shall wear protective clothing and other apparatus as appropriate to the work being performed, as required by OSHA and other laws and ordinances.

B. PART 2: PRODUCTS
   a) Not applicable to this section.

C. PART 3: EXECUTION
   1. GENERAL
      a) Comply with applicable requirements specified in Division 15 - Mechanical and in Division 16 - Electrical.
      b) Maintain and operate systems to assure continuous service.
      c) Modify and extend systems as work progress requires.

END OF SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
A. PART 1: GENERAL

1. SUMMARY
   a) Requirements of this section are general in nature. Refer to individual specification sections for additional, specific requirements.
   b) Delivery
      (1) Deliver manufactured products to project site in manufacturer's original packaging with labels and seals intact. Labels shall indicate manufacturer and product name, description, mixing and application instructions, and fire-resistive classifications as applicable.
      (2) Inspect materials upon delivery to ensure proper material, color, type, quantity.
      (3) Deliver finish materials only after spaces are enclosed and adequate indoor storage facilities are available.
   c) Storage
      (1) Store materials and equipment under cover, off ground at least 4” and protect from excessive heat and freezing, except for materials not subject to damage or deterioration by contact with environmental conditions. Observe manufacturer’s recommendations for positioning, separation and ventilation, as applicable.
      (2) Prevent corrosion, soiling, breakage of materials, or contact with deleterious materials.
      (3) Store and handle products subject to spillage in areas where spills will not deface finished surfaces or other Work or contaminate soil.
      (4) Flammable or hazardous materials
         (a) Store minimum quantities in protected areas.
         (b) Provide appropriate type fire extinguisher near storage areas.
         (c) Observe manufacturer’s precautions and applicable ordinances and regulations.
      (5) Comply with each manufacturer's instructions and recommendations for products storage and handling.
      (6) Provide material safety data sheet for all required materials in accordance with governing regulations.
   d) Handling
      (1) Handle materials and equipment to prevent damage, deterioration, or contamination.
      (2) Installation of materials which are physically damaged or stained prior to time for installation is prohibited.
   e) Inspection and Installation
      (1) Comply with manufacturer's product data in all aspects of basic material usage, handling, installation and substrate preparation, except where more stringent requirements are specified in contract documents.
      (2) Be responsible for verifying and obtaining proper substrate conditions, tolerances, and material alignments to receive applied or attached materials and construction.
      (3) Provide substrates sound, clean, dry and free of imperfections or conditions which would be detrimental to reception of applied materials.
      (4) Align material to give smooth, uniform surface planes within specified tolerances and straight, plumb surfaces.
      (5) Inspect substrates prior to installation of applied materials. Correct unacceptable conditions prior to proceeding with Work.
      (6) Provide finished surfaces clean, uniform, and free of damages, soiling, or defects in material and finish.
      (7) Finished surfaces: Match color and texture of samples provided or approved by Owner's Representative.
      (8) Protection
         (a) Protect finished surfaces from damage and soiling during application, drying or curing, as applicable.
         (b) Provide temporary protective coverings or barriers as required.
SECTION 01 70 00 - CONTRACT CLOSEOUT

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Administrative provisions for Completion and for final acceptance.

3. COMPLETION
   a) When Contractor considers Work or designated portion of Work is complete, submit written notice with list of items to be completed or corrected.
   b) Should Inspecting Consultant's inspection find Work is not complete, he will promptly notify Contractor in writing, listing observed deficiencies.
   c) Contractor shall remedy deficiencies and send a second written notice of completion.
   d) When Inspecting Consultant finds Work is complete, he will prepare a Certificate of Substantial Completion in accordance with provisions of General Conditions.

4. FINAL COMPLETION
   a) When Contractor considers Work is complete, submit written certification
      (1) Contract Documents have been reviewed.
      (2) Work has been inspected for compliance with Contract Documents.
      (3) Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificate of Substantial Completion have been corrected.
      (4) Equipment and systems have been tested, adjusted and balanced, and are fully operational.
      (5) Operation of systems has been demonstrated to Owner's personnel.
      (6) Work is complete and ready for final inspection.
      (7) Should Inspecting Consultant's inspection find Work incomplete, he will promptly notify Contractor in writing listing observed deficiencies.
   b) Contractor shall remedy deficiencies and send a second certification of final completion.
   c) When Inspecting Consultant finds work is complete, Owner's Representative will consider closeout submittals.

5. REINSPECTION FEES
   a) Should status of completion of Work require reinspection by Inspecting Consultant due to failure of Work to comply with Contractor's claims on initial inspection, Inspecting Consultant and appropriate consultants may request additional compensation for reinspection services. Contractor shall be responsible for payment of this additional compensation, and it may be deducted from final payment to Contractor, as approved by Owner's Representative.

6. CLOSEOUT SUBMITTALS
   a) Evidence of Compliance with Requirements of Governing Authorities:
      (1) Certificate of Occupancy.
      (2) Certificates of Inspection required for mechanical and electrical systems.
   b) Project Record Documents: Under provisions of Section 01 78 39 - Project Record Documents.
   c) Product Data and Contact List: Under provisions of Section 01 78 39 - Project Record Documents.
   d) Warranties and Bonds: Under provisions of Section 01 78 33/36 - Warranties and Bonds.
   e) Keys and Keying Schedule: Under provisions of Section 08 70 00 - Finish Hardware.
   f) Evidence of Payment and Release of Liens: In accordance with Conditions of the Contract.
   g) Consent of Surety to Final Payment.
   h) Certificates of Insurance for Products and Completed Operations: In accordance with Supplementary Conditions.

7. STATEMENT OF ADJUSTMENT ACCOUNTS
   a) Submit final statement reflecting adjustments to Contract Sum indicating
      (1) Original Contract Sum.
      (2) Previous change orders.
      (3) Changes under allowances.
      (4) Changes under unit prices.
      (5) Deductions for uncorrected work.
(6) Penalties and bonuses.
(7) Deductions for liquidated damages.
(8) Deductions for reinspection fees.
(9) Other adjustments to Contract Sum.
(10) Total Contract Sum as adjusted.
(11) Previous payments.
(12) Sum remaining due.

b) Contractor will issue a final Change Order reflecting approved adjustment to Contract Sum not previously made by change orders.

8. APPLICATION FOR FINAL PAYMENT
   a) Submit application for final payment in accordance with provisions of Conditions of the Contract.

END OF SECTION 01 70 00 - CONTRACT CLOSEOUT
SECTION 01 73 29 - CUTTING AND PATCHING

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplemental General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Requirements and limitations for cutting and patching of Work.

3. SUBMITTALS
   a) Submit written request in advance of cutting or alteration which affects:
      b) Structural integrity of any element of the Project.

4. PAYMENT FOR COSTS
   a) Costs resulting from ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of Architect, or other consultants shall be borne by the partly responsible for ill-timed, rejected or non-conforming Work.

B. PART 2: PRODUCTS

1. MATERIALS
   a) Products: Those required for original installation.
   b) For any change in materials, submit request for substitution under provisions of Section 01 25 00 - Product Options & Substitutions.

C. PART 3: EXECUTION

1. GENERAL
   a) Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
      (1) Fit the several parts together, to integrate with other work.
      (2) Uncover work to install ill-timed work.
      (3) Remove and replace defective and non-conforming work.
      (4) Remove samples of installed work for testing.
      (5) Provide openings in elements of Work for penetrations of mechanical and electrical work.

2. INSPECTION
   a) Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
   b) After uncovering, inspect conditions affecting performance of work.
   c) Beginning of cutting or patching means acceptance of existing conditions.

3. PREPARATION
   a) Provide temporary supports to assure structural integrity of surroundings; devices and methods to protect other portions of Project from damage.
   b) Provide protection from elements for areas which may be exposed by uncovering work.

4. PERFORMANCE
   a) Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
   b) Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
   c) Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
   d) Restore work with new products in accordance with requirements of Contract Documents.
   e) Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
   f) At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated packing material, full thickness of the construction element.
   g) Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

END OF SECTION 01 73 29 - CUTTING AND PATCHING
SECTION 01 74 00 - CLEANING UP

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Clean up during construction.
   b) Subcontractor clean-up.
   c) Final clean-up.

3. SAFETY REQUIREMENTS
   a) Store volatile and toxic waste in covered metal containers. Remove from Project site daily. Provide adequate ventilation during use of volatile or toxic substances.
   b) Prohibited practices
      (1) Allowing volatile or toxic wastes to accumulate on Project site.
      (2) Burning or burying of waste materials or rubbish on Project site.
      (3) Disposal of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains, on pavements, in gutters or downspout, or on Project site.
      (4) Disposal of waste or cleaning materials which contain materials harmful to plant growth on Project site.
   c) Clean up accidentally spilled materials as quickly as possible in accordance with Governing regulations.

4. CLEAN-UP DURING CONSTRUCTION
   a) Execute cleaning procedures to ensure that building, Project site, and adjacent properties are maintained free from debris and rubbish.
   b) Wet down materials subject to blowing. Throwing waste materials from heights is prohibited.
   c) Provide on-site containers for waste collection. Place all waste materials and rubbish in containers daily to prevent accumulation. Remove waste from Project site when containers become full.
   d) Legally dispose of all waste materials, rubbish, volatile materials, and cleaning materials off Project site.
   e) Clean and maintain interior spaces prior to start of finish painting in a "broom clean" state until Date of Completion. Protect newly finished and clean surfaces from contamination during cleaning operations.
   f) Accumulation of debris contributing to survival or spread of rodents, roaches, or other pests is prohibited.
      (1) Remove debris containing food scraps on a daily basis.
      (2) Contractor shall be responsible for securing services of a pest exterminator at no additional cost to the Owner, if required by site conditions during construction.
   g) Graffiti or other similar distasteful comments or illustrations authored on any building materials used on Project is prohibited. Monitor Project for violations of this criteria, and, if found, take appropriate action immediately to cover or replace defaced materials as necessary.

5. SUBCONTRACTOR CLEAN-UP
   a) Each subcontractor on Project Site is required to conform to particular requirements of this complete Section 01 74 00 - Cleaning Up.
   b) Each individual subcontractor is required to maintain Project site, individual buildings, and units within buildings clean and neat regarding Work included under their separate contracts with Contractor.
   c) If subcontractor fails to keep Project clean or to clean up waste material resulting from Work under his Contract at times scheduled, Contractor may clean up and apportion costs to responsible subcontractors after 24 hour written notice.

6. FINAL CLEAN-UP
   a) In addition to removal of debris and cleaning specified in other section, clean interior and exterior exposed to view surfaces.
   b) Remove temporary protection and labels not required to remain.
   c) Clean finishes free of dust, stains, films and other foreign substances.
   d) Clean transparent and glossy materials to a polished condition; remove foreign substances.
   e) Vacuum clean carpet and similar soft surfaces.
   f) Clean, damp mop, wax, and polish resilient and hard surface floor as specified.
   g) Clean surfaces of equipment; remove excess lubrication.
h) Clean plumbing fixtures, and food service equipment, to a sanitary condition.

i) Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.

j) Clean light fixtures and lamps.

k) Maintain cleaning until Final Completion.

l) Remove waster, foreign matter, and debris from roofs, and drainage systems. m) Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

END OF SECTION 01 74 00 - CLEANING UP
SECTION 01 78 00 – CLOSEOUT SUBMITTALS: WARRANTIES AND BONDS

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Preparation and submittal of warranties and bonds.
   b) Schedule of submittals.

3. FORM OF SUBMITTAL
   a) Bind in commercial quality 8-1/2 x 11-inch three-ring binders, with hardback, cleanable, plastic covers.
   b) Label cover of each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor; and name of responsible principal.
   c) Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
   d) Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

4. PREPARATION OF SUBMITTALS
   a) Obtain warranties and bonds, executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work. Except for items put into use with Owner's Representative permission, leave date of beginning of time of warranty until the Date of Completion is determined.
   b) Verify that documents are in proper form, contain full information, and are notarized.
   c) Co-execute submittals when required.
   d) Retain warranties and bonds until time specified for submittal.

5. TIME OF SUBMITTALS
   a) Submit within (60) days of Notice to Proceed:
      (1) Binder
      (2) Table of Contents
      (3) Indexed Dividers
   b) For equipment or component parts of equipment put into service during construction with Owner's Representative permission, submit documents within ten (10) days after acceptance.
   c) Make other submittals within ten (10) days after Date of Completion, prior to final Application for Payment.
   d) For items of Work when acceptance is delayed beyond Date of Completion, submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.
SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplemental General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Format and content of manuals.
   b) Instruction of Owner's personnel.

3. QUALITY ASSURANCE
   a) Prepared instructions and data by personnel experienced in maintenance and operation of described products.

4. FORMAT
   a) Prepare data in the form of an instructional manual.
   b) Binders: Commercial quality, 8-1/2 x 11-inch three-ring binders with hardback, cleanable, plastic covers; 3-inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
   c) Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; title of Project and subject matter of contents.
   d) Arrange content by systems, under section numbers and sequence of Table of Contents of this Project Manual.
   e) Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
   f) Text: Manufacturer's printed data, or typewritten data on 20-pound paper.
   g) Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

5. CONTENTS
   a) Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
   b) For Each Product or System: List names, addresses, and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
   c) Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
   d) Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Document as maintenance drawings.
   e) Typed Text: As required to supplement product date. Provide logical sequence of instructions for each procedures, incorporating manufacturer's instructions specified in Section 01 45 00 - Contract Quality Control.
   f) Warranties and Bonds: Bind in copy of each.

6. MANUAL FOR MATERIALS AND FINISHES
   a) Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.
   b) Instruction for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
   d) Additional Requirements: As specified in individual Specifications sections.
   e) Provide a listing of Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

7. MANUAL FOR EQUIPMENT AND SYSTEMS
   a) Each Item of Equipment and Each System: Include description of unit or system, and component parts, and number of replaceable parts.
   b) Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.
   c) Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating
instruction, all as included in manufacturer's literature.

d) Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

e) Provide servicing and lubrication schedule, and list of lubricants required.

f) Include manufacturer's printed operation and maintenance instructions.

g) Include sequence of operation by controls manufacturer.

h) Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

i) Provide as-installed control diagrams by controls manufacturer.

j) Provide charts of valve, with location and function of each valve.

k) Additional Requirements: As specified in individual Specifications sections.

l) Provide serial numbers for all appliances and HVAC equipment.

8. Instruction of owner personnel

a) Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

b) Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

c) Prepare and insert additional data in Operation and Maintenance Manual when need for such data become apparent during instruction.

9. Submittals

a) Submit two (2) copies of preliminary draft or proposed formats and outlines of contents before start of Work. Owner's Representative will review draft and return one (1) copy with comments.

b) Submit one (1) copy of completed volumes in final form 15-days prior to final inspection. Copy will be returned after final inspection, with Owner's Representative's comments. Revise content of documents as required prior to final submittal.

c) Submit two (2) copies of revised volumes of data in final form within 10-days after final inspection.

END OF SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA
SECTION 01 78 33 - BONDS AND CERTIFICATIONS

A. PART 1: GENERAL
   1. Performance Bond, AIA Document A312 (latest edition)
   2. Labor and Material Payment Bond, AIA Document A312 (latest edition)

END OF SECTION 01 78 33 - BONDS AND CERTIFICATIONS
I. SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Maintenance of Record Documents and Samples.
   b) Submittal of Record Documents and Samples.
   c) Submittal of Product Data and Contact List.

3. MAINTENANCE OF DOCUMENTS AND SAMPLES
   a) In addition to requirements in General Conditions, maintain at the site one (1) record copy of:
      (1) Contract Drawings and plan schedule.
      (2) Specifications.
      (3) Addenda.
      (4) Change Orders and other modifications of the Contract.
      (5) Reviewed Submittals.
      (6) Field test records.
      (7) Inspection certificates.
      (8) Manufacturer's certificates.
      (9) RFI & logs.
      (10) SK drawings and logs.
   b) Store Record Documents and samples in Field Office apart from documents used for construction. Provide files, racks, and secure storage for Record Documents and samples.
   c) Label and file Record Documents and samples in accordance with section number listings in Table of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
   d) Maintain Record Documents in a clean, dry and legible condition. Do not use Record Documents for construction purposes.
   e) Keep Record Documents and samples available for inspection by Owner's Representative and Inspecting Consultant.

4. RECORDING
   a) Record information on a set of blue line opaque drawings, and in a copy of a Project Manual. At completion of the project, transfer information from the blue line prints onto reverse reading mylar reproducibles.
   b) Provide felt tip marking pens, maintaining separate colors for each major system, for record information.
   c) Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
   d) Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:
      (1) Measured horizontal locations for water, storm drainage, and sanitary sewer drainage piping and measured horizontal and vertical locations for all other underground utilities, referenced to permanent surface improvements.
      (2) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
      (3) Field changes of dimension and detail.
      (4) Changes made by Modifications, including all RFI's.
      (5) Details not on original Contract Drawings or SK Drawings.
      (6) References to related shop drawings and modifications.
   e) Other Documents: Maintain manufacturer's certifications, inspection certifications, field test records, and other documents required by individual specification sections.

5. SUBMITTALS
   a) At Contract closeout, deliver Record Documents and samples under provisions of Section 00 70 00 - Contract Closeout.
      (1) Transmit with cover letter in duplicate, listing:
         (a) Date.
         (b) Project title and number.
         (c) Contractor's name, address, and telephone number.
         (d) Number and title of each Record Document.
         (e) Signature of Contractor or authorized representative.
b) Product Data and Contact List

(1) Preparation of Submittals
(a) Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer and Contractor with names of responsible parties; schedule of products and systems, indexed to content of the volume.
(b) For Each Product or System: List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
(c) Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
(d) Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as informational drawings.
(e) Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
(f) Warranties and Bonds: Bind in copy of each. See Section 01 78 00 - Warranties and Bonds.

(2) Form of Submittals
(a) Prepare data in the form of an instructional manual.
(b) Binders: Commercial quality, 8-1/2 x 11-inch three-ring binders with hardback, cleanable, plastic covers; 3-inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
(c) Cover: Identify each binder with typed or printed title "Product DATA and Contact List"; list title of Project and identify subject matter of contents.
(d) Arrange content by systems, under section numbers and sequence of Table of Contents of this Project Manual.
(e) Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
(f) Text: Manufacturer's printed data, or typewritten data on 20-pound paper.
(g) Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

(3) Time of Submittals
(a) Submit two (2) copies of preliminary draft of proposed formats and outlines of contents within 60 days of Notice to Proceed. Owner's Representative will review draft and return one (1) copy with comments.
(b) Submit one (1) copy of completed volumes in final form 15-days prior to final inspection. Copy will be returned after final inspection, with Owner's Representative's comments. Revise content of documents as required prior to final submittal.
(c) Submit two (2) copies of revised volumes of data in final form within 10-days after final inspection.

B. PART 2: PRODUCTS
Not applicable to this Section.

C. PART 3: EXECUTION
Not applicable to this Section.

D. Part 4: FORMS
Forms may be obtained from Owner's Representative.

I. END OF SECTION 01 78 39 - PROJECT RECORD DOCUMENTS
A. PART 1: GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. REQUIREMENTS INCLUDED
   a) Products required.
   b) Storage and delivery of products.

3. Products required
   a) Provide quantities of products, spare parts, maintenance tools, and maintenance materials specified in individual section to be provided to Owner's Representative in addition to that required for completion of Work.
   b) Products: Indentical to those installed in the Work. Include quantities in original purchase from manufacturers to avoid variations in manufacture.

4. Storage, Maintenance
   a) Store products with products to be installed in the Work, under provisions of Section 01 66 00 - Delivery, Storage and Handling.
   b) When adequate, secure storage facilities are available at site, capable of maintaining conditions required for storage and not required for Contract work or storage, or for Owner's needs, spare products may be stored in available space.
   c) Maintain spare products in original containers with labels intact and legible, until delivery to Owner.

5. Delivery
   a) Coordinate with Owner's Representative: Deliver and unload spare products to Owner at Project site and obtain receipt prior to final payment.
   b) For portions of Project accepted and occupied by Owner prior to Completion, deliver a proportional part of spare products to Owner's Representative; obtain receipt.

END OF SECTION 01 93 00 – Facility Maintenance:
SPARE PARTS, OVERAGES AND MAINTENANCE MATERIALS
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Demolition and removal of selected portions of building or structure.
      2. Demolition and removal of selected site elements.
      3. Salvage of existing items to be reused or recycled.
   B. Related Requirements:
      1. Section 011000 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
      2. Section 015639 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective demolition.
      3. Section 017300 "Execution" for cutting and patching procedures.
      4. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS
   A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
   B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.
   C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
   D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP
   A. Unless otherwise indicated, demolition waste becomes property of Contractor.
   B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
      1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS
   A. Predemolition Conference: Conduct conference at Project site.
      1. Inspect and discuss condition of construction to be selectively demolished.
      2. Review structural load limitations of existing structure.
      3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delay.
      4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
      5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS
   A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection and for dust control. Indicate proposed locations and construction of barriers.
B. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
2. Coordination for shutoff, capping, and continuation of utility services.
C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
D. Predemolition Photographs or Video: Submit before Work begins.
E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
F. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS
A. Inventory: Submit a list of items that have been removed and salvaged.
B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes. Document percentages of diversion as required by LEED-H MR-3.2.b.

1.8 QUALITY ASSURANCE
A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS
A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
C. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.
D. Storage or sale of removed items or materials on-site is not permitted.
E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
D. Survey of Existing Conditions: Record existing conditions by use of preconstruction videotapes.
1. Inventory and record the condition of items to be removed and salvaged. Provide video of conditions that might be misconstrued as damage caused by salvage operations.

2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Disconnect, demolish, and remove plumbing and HVAC systems, equipment, and components indicated to be removed.
      a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
      b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
      c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
      e. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
      f. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.
3.4 SELECTIVE DEMOLITION, GENERAL
A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

Removed and Salvaged Items:
1. Store items in a secure area until needed for reinstallation. C.

Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS
A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
C. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 075423 "TPO Roofing" for new roofing requirements.
1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.6 DISPOSAL OF DEMOLISHED MATERIALS
A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
   4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING
A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section specifies cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes for the building.

B. Cast-in-place concrete includes the following:
   1. Foundations and footings.
   2. Slabs-on-grade.
   3. Equipment pads and bases.

1.03 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.

C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

D. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually. Architect's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.

E. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:
   1. Reglets.
   2. Vapor retarder/barrier.

F. Laboratory test reports for concrete materials and mix design test.

G. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

H. Minutes of preinstallation conference.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
   1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
   2. ACI 318, "Building Code Requirements for Reinforced Concrete."

B. Concrete Testing Service: Engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes.
C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section “Coordination” and the following:

1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
   a. Contractor's superintendent.
   b. Agency responsible for concrete design mixes.
   c. Agency responsible for field quality control.
   d. Ready-mix concrete producer.
   e. Concrete subcontractor.
   f. Primary admixture manufacturers.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete: 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 Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two 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.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

1. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.02 REINFORCING MATERIALS

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

B. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

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).

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Fly Ash: ASTM C 618, Type F.

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

1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

D. Water: Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      a. Air-Tite, Cormix Construction Chemicals.
      b. Air-Mix or Perma-Air, Euclid Chemical Co.
      c. Darex AEA or Daravair, W.R. Grace & Co.
      d. MB-VR or Micro-Air, Master Builders, Inc.
      e. Sealtight AEA, W.R. Meadows, Inc.
      f. Sika AER, Sika Corp.

G. Water-Reducing Admixture: ASTM C 494, Type A.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      b. PSI N, Cormix Construction Chemicals.
      c. Eucon WR-75, Euclid Chemical Co.
      d. WRDA, W.R. Grace & Co.
      e. Pozzolith Normal or Polyheed, Master Builders, Inc.
      f. Metco W.R., Metalcrete Industries.
      g. Prokrete-N, Prokrete Industries.
      h. Plastocrete 161, Sika Corp.

H. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      a. Super P, Anti-Hydro Co., Inc.
      b. Cormix 200, Cormix Construction Chemicals.
      c. Eucon 37, Euclid Chemical Co.
      d. WRDA 19 or Daracem, W.R. Grace & Co.
      e. Rheobuild or Polyheed, Master Builders, Inc.
      f. Superslump, Metalcrete Industries.
      g. PSPL, Prokrete Industries.
      h. Sikament 300, Sika Corp.

I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      a. Q-Set, Conspec Marketing & Manufacturing Co.
      b. Lubricon NCA, Cormix Construction Chemicals.
      c. Accelguard 80, Euclid Chemical Co.
      e. Pozzutec 20, Master Builders, Inc.
      f. Accel-Set, Metalcrete Industries.

J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      a. PSI-R Plus, Cormix Construction Chemicals.
      b. Eucon Retarder 75, Euclid Chemical Co.
2.04 RELATED MATERIALS

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch thick galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

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

C. Sand Cushion: Clean, manufactured or natural sand.

D. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:
   1. Polyethylene sheet not less than 6 mils thick.

E. Vapor Barrier: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic antistick sheet. Water vapor transmission rate of 1 perm when tested according to ASTM E 96, Method B. Provide manufacturer’s recommended mastics and gusset tape.
   1. Product: Subject to compliance with requirements, provide Sealtight Premoulded Membrane by W.R. Meadows, Inc.

F. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd., complying with AASHTO M 182, Class 2.

G. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
   1. Waterproof paper.
   2. Polyethylene film.
   3. Polyethylene-coated burlap.

H. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. m when applied at 200 sq. ft./gal.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      b. Spartan-Cote, The Burke Co.
      c. Conspec #1, Conspec Marketing & Mfg. Co.
      d. Sealco 309, Cormix Construction Chemicals.
      e. Day-Chem Cure and Seal, Dayton Superior Corp.
      f. Eucocure, Euclid Chemical Co.
      g. Horn Clear Seal, A.C. Horn, Inc.
      h. L&M Cure R, L&M Construction Chemicals, Inc.
      i. Masterkure, Master Builders, Inc.
      j. CS-309, W.R. Meadows, Inc.
      k. Seal N Kure, Metalcrete Industries.
      l. Kure-N-Seal, Sonneborn-Chemrex.
      m. Stontop CS2, Stonhard, Inc.

I. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
   1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
   2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      b. Sealco - VOC, Cormix Construction Chemicals.
      c. Safe Cure and Seal, Dayton Superior Corp.
      d. Aqua-Cure, Euclid Chemical Co.
e. Dress & Seal WB, L&M Construction Chemicals, Inc.
f. Masterkure 100W, Master Builders, Inc.
g. Vocomp-20, W.R. Meadows, Inc.
h. Metcure, Metalcrete Industries.
i. Stontop CS1, Stonhard, Inc.

J. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
b. Eucobar, Euclid Chemical Co.
c. E-Con, L&M Construction Chemicals, Inc.
d. Confilm, Master Builders, Inc.
e. Waterhold, Metalcrete Industries.

K. Bonding Agent: Polyvinyl acetate or acrylic base.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
a. Polyvinyl Acetate (Interior Only):
   1) Superior Concrete Bonder, Dayton Superior Corp.
   2) Euco Weld, Euclid Chemical Co.
   3) Weld-Crete, Larsen Products Corp.
   4) Everweld, L&M Construction Chemicals, Inc.
   5) Herculox, Metalcrete Industries.
   6) Ready Bond, Symons Corp.
b. Acrylic or Styrene Butadiene:
   1) Acrylic Bondcrete, The Burke Co.
   2) Strongbond, Conspec Marketing and Mfg. Co.
   3) Day-Chem Ad Bond, Dayton Superior Corp.
   4) SBR Latex, Euclid Chemical Co.
   6) Hornweld, A.C. Horn, Inc.
   7) Everbond, L&M Construction Chemicals, Inc.
   8) Acryl-Set, Master Builders Inc.
   9) Intralok, W.R. Meadows, Inc.
   10) Acrylpave, Metalcrete Industries.
   11) Sonocrete, Sonneborn-Chemrex.
   12) Stonlock LB2, Stonhard, Inc.
   13) Strong Bond, Symons Corp.

L. 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.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
a. Burke Epoxy M.V., The Burke Co.
b. Spec-Bond 100, Conspec Marketing and Mfg. Co.
c. Resi-Bond (J-58), Dayton Superior.
d. Euco Epoxy System #452 or #620, Euclid Chemical Co.
e. Epoxite Binder 2390, A.C. Horn, Inc.
f. Epabond, L&M Construction Chemicals, Inc.
g. Concresive Standard Liquid, Master Builders, Inc.
h. Rezi-Weld 1000, W.R. Meadows, Inc.
i. Metco Hi-Mod Epoxy, Metalcrete Industries.
j. Sikadur 32 Hi-Mod, Sika Corp.
k. Stonset LV5, Stonhard, Inc.
l. R-600 Series, Symons Corp.

2.05 PROPORTIONING AND DESIGNING MIXES
A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
   1. Do not use the same testing agency for field quality control testing.
   2. Limit use of fly ash to not exceed 25 percent of cement content by weight.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.

C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
   1. 3000 psi, 28-day compressive strength; water-cement ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained).

D. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
   1. Subjected to freezing and thawing: W/C 0.45.
   2. Subjected to deicers/watertight: W/C 0.40.
   3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.

E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
   1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
   2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
   3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2 - 3 inch slump concrete.
   4. Other concrete: Not more than 4 inches.

F. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.06 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F.

C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

D. 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 1-1/2 percent within the following limits:
   1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
      a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2 inch maximum aggregate.
      b. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1 inch maximum aggregate.
      c. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4 inch maximum aggregate.
      d. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2 inch maximum aggregate.
   2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.07 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 GENERAL

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.02 FORMS

A. General: 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. Maintain formwork construction tolerances and 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 cement paste from leaking.

C. Fabricate forms for easy removal without hammering or 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 for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. 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.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.03 VAPOR RETARDER/BARRIER INSTALLATION

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.
   1. Cover vapor retarder/barrier with sand cushion and compact to depth indicated.

3.04 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute’s recommended practice for “Placing Reinforcing Bars,” for details and methods of reinforcement placement and supports and as specified.
   1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

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

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.
D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. 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 welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.05 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

E. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

F. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
   1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
   2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
   3. If joint pattern is not shown, provide joints not exceeding 15 ft. in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
   4. Joint fillers and sealants are specified in Division 7 Section "Elastomeric Sealants."

3.06 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork 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.

B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. Install dovetail anchor slots in concrete structures as indicated on drawings.

D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.07 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.
3.08 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.


C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches 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.
   1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
   2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
   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 with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
   3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
      1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
      2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
   2. Do not use liquid nitrogen to cool concrete.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
   1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. 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. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
   3. Keep subgrade moisture uniform without puddles or dry areas.
   4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.09 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another 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 and other projections completely removed and smoothed.

C. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
1. Combine one part Portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard Portland cement and white Portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a 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 another thin film-finish coating system.
1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 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 specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

D. Provide moisture curing by the following methods:
   1. Keep concrete surface continuously wet by covering with water.
   2. Use continuous water-fog spray.
   3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4 inch lap over adjacent absorptive covers.

E. Provide moisture-retaining cover curing as follows:
   1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
   1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
   2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
   1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.14 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the 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. 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 Architect.

3.15 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
   1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brushcoat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
   2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
   1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
   1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, 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 during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
   4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. 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 same manner as adjacent concrete.

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

F. Repair methods not specified above may be used, subject to acceptance of Architect.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION
A. Laboratory tests for concrete materials and mix design will be performed in accordance with Section 01 45 00 Quality Control, Testing Laboratory Services.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
   a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below, when 80 deg F and above, and one test for each set of compressive-strength specimens.
   d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
   e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.

4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

C. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03 30 00
SECTION 06 05 60 - DECORATIVE PLASTIC LAMINATE

PART 1 – GENERAL

1.1 SUMMARY
   A. Drawings and general provisions of the Contract, including General and Supplementary
      Conditions and Division 1 Specification Sections, apply to this Section. B. Section Includes:
      1. Solid color decorative laminate surfacing for finishing countertops as indicated, including accessories and trim needed for a complete installation.

1.2 RELATED WORK
   A. Work of this section is related to work specified in the following sections:
      1. Division 6 Section Finish Carpentry.
      2. Division 6 Section Interior Architectural Woodwork.
      3. Division 12 Section Residential Casework
      4. Division 16 Section Plumbing Fixture
   B. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.3 REFERENCES
   A. Reference Standards: In addition to requirements, comply with applicable provisions of following for design, materials, fabrication, and installation of component parts:
      1. NEMA LD3-2005.

1.4 SUBMITTALS
   A. Product Data: Manufacturer's technical literature for decorative plastic laminate material, adhesive for bonding plastic laminate, miscellaneous accessories and related components. B. Samples:
      1. Decorative plastic laminates, 5 by 7 inches (125 by 175 mm), for each type, color, pattern, and surface finish [with 1 sample applied to core material] [and specified edge material applied to 1 edge].
   C. Product [Schedule]: For decorative plastic laminate materials. [Use same designations indicated on Drawings.]
   D. Informational Submittals: Submit following packaged separately from other submittals:
      1. Manufacturer's written handling, storage and installation instructions.
   E. LEED documentation required.

1.5 QUALITY ASSURANCE
   A. Fabricator/Installer Qualifications: Company specializing in fabricating and installing decorative plastic laminate finished work with a minimum 3 years experience.
   B. Source Limitations: Obtain decorative plastic laminate materials through one source from a single manufacturer.
   C. Fire-Test-Response Characteristics: Provide decorative plastic laminate with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
      1. Flame-Spread Index: 25 or less.
      2. Smoke-Developed Index: 450 or less.
   D. Mockups: Build mockups to [verify selections made under sample Submittals and to demonstrate aesthetic effects][and qualities of materials and execution][set quality standard for fabrication and installation].

1.6 DELIVERY, STORAGE AND HANDLING
   A. Deliver, store, handle, and protect materials in accordance with manufacturer’s written instructions.
      1. Provide protective coverings of suitable material. Take special precautions at corners.

1.7 SEQUENCING
   A. Coordinate sizes and locations of plumbing, cut-outs and other related Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS
   A. Acceptable Manufacturer: Formica Corp., 45241 (513-786-3400). Or
B. Substitutions allowed upon approval by Owner’s representative or Architect.

2.2 MATERIALS AND COMPONENTS
A. Decorative Plastic Laminate: Manufacturers standard and custom decorative surface papers with melamine resins, bonded under heat and pressure to kraft paper backing sheet with phenolic resins.
B. Standard Decorative Laminate – General Purpose Type - Decorative Laminate:
   1. Surface burning characteristics in accordance with ASTM E84.
   2. Colors and Patterns: See drawings.
C. Solid Color Decorative Laminate:
   1. Grade: [Grade CC, HCS]
   2. Thickness: [.040 inches (1.02 mm)].
   3. Surface burning characteristics in accordance with ASTM E84.
   4. Finish:
   5. Colors and Patterns: See drawings.

2.3 ACCESSORY MATERIALS
A. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

PART 3 – EXECUTION

3.1 EXAMINATION AND PREPARATION
A. Examine surfaces for conditions that would adversely affect decorative plastic laminate surfacing.

3.2 INSTALLATION
A. General: Install decorative plastic laminate in accordance with manufacturer's written installation instructions, approved Submittals and requirements of [Division 6 Section “Finish Carpentry”] [Division 6 Section “Interior Architectural Woodwork”].
   1. Provide templates and rough-in measurements.

3.3 CLEANING AND PROTECTION
A. Cleaning:
   1. Clean decorative plastic laminate surfaces in accordance with manufacturer's instructions.
B. Protection:
   1. Do not permit construction near unprotected surfaces.

END OF SECTION 06 50 60 - Decorative Plastic Laminate-FORMICA
PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Wood framing.
   2. Wood supports.
   3. Wood blocking.
   4. Wood cants.
   5. Wood nailers.
   7. Wood grounds.
   8. Plywood backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product indicated.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.

C. Research/Evaluation Reports: For the following:
   1. Treated wood.
   2. Power-driven fasteners.
   4. Expansion anchors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Manufacturers: Subject to compliance with requirement.

2.2 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Provide dressed lumber, S4S, unless otherwise indicated.
   4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
   1. Allowable Design Stresses: Meet or exceed those indicated per manufacturer’s published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Wood Structural Panels:
   1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
2. Oriented Strand Board: DOC PS 2.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 18 inches above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.4 DIMENSION LUMBER

A. General: Of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated. Must match existing wood at the existing building. Architect will approve wood used.

B. Non-Load-Bearing Interior Partitions: No. 2 grade and any of the following species:
1. Mixed southern pine; SPIB.
2. Eastern softwoods; NELMA.
3. Northern species; NLGA.
4. Western woods; WCLIB or WWPA.

C. Framing Load-Bearing Partitions: No. 2 grade and any of the following species:
1. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
2. Southern pine; SPIB.
3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

D. Framing Load-Bearing Partitions: Any species and grade with a modulus of elasticity of at least 1,300,000 psi or 1,100,000 psi and an extreme fiber stress in bending of at least 850 psi 2-inch nominal thickness and 12-inch nominal width for single-member use.

E. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 2 grade; NELMA.
3. Northern species, No. 2 grade; NLGA.
4. Western woods, No. 2 Common grade; WCLIB or WWPA.

2.5 TIMBER AND MISCELLANEOUS LUMBER

A. For timbers of 5-inch nominal size and thicker, provide material complying with the following requirements:
1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; No. 1 grade; NLGA, WCLIB, or WWPA.
2. Species and Grade: Eastern hemlock, Eastern hemlock-tamarack, or Eastern hemlock-tamarack (north); No. 1 grade; NELMA or NLGA.
3. Species and Grade: Southern pine, No. 1 grade; SPIB.

B. Provide miscellaneous lumber for support or attachment of other construction, including the following:
1. Rooftop equipment bases and support curbs.
2. Blocking.
3. Cants.
5. Furring.

C. For items of dimension lumber size, provide No. 2 grade lumber with 19 percent maximum moisture content of any species.

D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Eastern softwoods, No. 2 grade; NELMA.
   3. Northern species, No. 2 grade; NLGA.
   4. Western woods, No. 2 Common grade; WCLiB or WWPA.

2.6 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick.

2.7 MISCELLANEOUS MATERIALS

A. Fasteners:
   1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
   3. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

B. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
   1. Manufacturers:
      a. Alpine Engineered Products, Inc.
      b. Cleveland Steel Specialty Co.
      c. Harlen Metal Products, Inc.
      d. KC Metals Products, Inc.
      e. Silver Metal Products, Inc.
      f. Simpson Strong-Tie Company, Inc.
      g. Southeastern Metals Manufacturing Co., Inc.
      h. United Steel Products Company, Inc.

   2. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
   3. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

D. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

E. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

F. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.
3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. CABO NER-272 for power-driven fasteners.
   2. Published requirements of metal framing anchor manufacturer.
   6. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in the International One- and Two-Family Dwelling Code.

D. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.


F. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.


H. Apply building paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch overlap.

I. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 06 10 00
PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Model code evaluation reports for foam-plastic sheathing and building wrap.

B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer’s written instructions for handling, storing, installing, and finishing treated material.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

C. Material Certificates: For building sheathing specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
   1. Preservative-treated wood.
   2. Engineered wood products.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC PS 1.

B. Oriented Strand Board: DOC PS 2.

2.2 TREATED PLYWOOD

   1. Use treatment containing no arsenic or chromium.
   2. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

B. Provide preservative treated plywood for plywood in contact with masonry or concrete, vapor barriers, and waterproofing.

2.3 EXTERIOR WALL SHEATHING

A. Plywood Wall Sheathing: Exposure 1, Structural I sheathing.

B. Oriented-Strand-Board Wall Sheathing: Exposure 1, Structural I sheathing.

C. Gypsum Wall Sheathing: Cannot be used for structural sheathing, see above. Any of the following:
2. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

D. Fiberboard Wall Sheathing: Can not be used for structural sheathing. AHA A194.1, Type IV, Grade 1 (Regular), \(1/2\) inch thick.

E. Insulating Foam Wall Sheathing: any of the following that conforms with the local Building Codes:
   1. Extruded-Polystyrene-Foam Wall Sheathing: ASTM C 578, Type IV.
   2. Foil-Faced, Polyisocyanurate-Foam Wall Sheathing: ASTM C 1289, Type I, Class 2. Foam-plastic core and facings shall have flame spread of 25 or less, when tested individually.

2.4 MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated.
   1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Sheathing Joint-and-Penetration Treatment Materials:
   1. Sealant for Gypsum Sheathing Board: Joint sealant recommended by sheathing manufacturer for application indicated.
   2. Sheathing Tape for Gypsum Sheathing Board: Self-adhering glass-fiber tape recommended by sheathing and tape manufacturers for application indicated.

C. Adhesives for Field Gluing Panels to Framing: APA AFG-01.

D. Flexible Flashing: Adhesive rubberized-asphalt compound, bonded to polyethylene film, with an overall thickness of 0.030 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Securely attach to substrates, complying with the following:
   1. CABO NER-272 for power-driven fasteners.
   2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2).

B. Sheathing Joint-And-Penetration Treatment: Seal sheathing joints according to sheathing manufacturer's written instructions.

END OF SECTION 06 16 00
SECTION 06 20 00 - FINISH CARPENTRY

A. PART 1 GENERAL

1. RELATED DOCUMENTS
a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
b) Section 06 10 00: Rough Carpentry
c) Section 06 17 53: Wood Trusses
d) Section 06 41 00: Cabinet Work
e) Section 07 62 00: Sheet Metal Flashing and Trim
   Section 07 92 00: Sealingants and Caulking
f) Section 08 10 00: Packaged Doors and Frames

2. REFERENCES
a) Standards of the Following as Referenced
   (1) Architectural Woodwork Institute (AWI)
   (2) American National Standards Institute (ANSI)
   (3) National Electrical Manufacturer's Association (NEMA)
b) Industry Standards
c) Grading rules and standards of the following apply to materials furnished under this section:
   (1) American Lumber Standards Committee (ALSC)
   (2) American Plywood Association (APA)
   (3) National Hardware Lumber Association (NHLA)
   (4) National Bureau of Standards (NBS) Voluntary Product Standards (PS)
   (5) West Coast Lumber Inspection Bureau (WCLIB)
   (6) Western Wood Products Association (WWPA)
d) Preservative treated material: meet specified standards of:
   (1) American Wood Preservers Association (AWPA)
   (2) American Wood Preservers Bureau (AWPB)
   (3) American Wood Preservers Institute (AWPI)
e) Plywood Grading Rules
   (1) Softwood plywood: NBS PS-1-83 (2)
   (2) Hardwood plywood: NBS PS-51-71

3. SUBMITTALS
a) Samples, submit as follows:
   (1) Finish samples: Indicate selected finishes on samples of species and grade material specified.
   (2) Hardware items: Submit samples to Owner's Representative.
   (3) LEED documentation

4. DELIVERY, STORAGE, AND HANDLING
a) Schedule delivery of finish carpentry Work to Project site to coincide with installation but not to cause delay in Work.
b) Immediately upon delivery, place materials indoors, under cover, protected from weather.
c) Store materials minimum 6" above ground on framework or blocking; cover with protective waterproof covering providing for adequate air circulation and ventilation. Store in dry space.

5. PROJECT CONDITIONS
a) Field measurements: Take field measurements to determine exact millwork sizes. Indicate exact dimensions on shop drawings.
b) Installation of interior finish carpentry or millwork should not happen until spaces are enclosed and dry.

B. PART 2 PRODUCTS

1. MATERIALS
a) General
   (1) Dimensions: Indicated lumber dimensions are nominal. Actual dimensions conform to industry standards established by ALSC and the Rules Writing Agencies.
   (2) Moisture content: 12% maximum.
   (3) Surfacing: Surface four sides, S4S, unless otherwise indicated.
   (4) Grades for exposed and semi-exposed finish carpentry and millwork and plywood are based on AWI Quality Standards. Grades for unexposed Work are based on Rules Writing Agencies grading rules.
b) Lumber
   (1) Species and grades
      (a) Unexposed millwork framing and blocking:
         (i) 1" by 4": Standard Grade West Coast Lumber
         (ii) 1 x 3 MDF
         (iii) Members larger than 2" by 4": #2 grade
      (b) Door frames: Prehung: Custom Grade White Pine, kiln dried (KD)

c) Sheet Material
   (1) Plywood: Thicknesses indicated
      (a) Plywood soffits: APA 303, 6-W rough sawn fir.
      (b) Unexposed and semi-exposed millwork and general carpentry: APA A-C G-1, Exterior.

e) Interior
   (1) Floor base
   (2) Window and door trim

a) Shop Finishing
   (1) Finish millwork items in accord with finishing requirements of Painting section.
   (2) Provide finish Work smooth, free from abrasion, tool marks, raised grain, and other Grade prohibited defects on exposed surfaces.

b) Tolerances: Fabricate millwork items to AWI Custom Grade unless otherwise indicated.

3. SOURCE QUALITY CONTROL
a) Inspection
   (1) Grade marks:
      (a) Identify lumber and plywood by official grade mark.
      (b) Lumber grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping, or combination designation, rules under which graded, where applicable, and condition of seasoning at time of manufacture.
      (c) Plywood: Appropriate grade trademark of APA. Indicate type, grade, class and identification index, and inspection and testing agency mark.
      (d) Conceal grade marks on components to be exposed to view in finished Work.

C. PART 3 EXECUTION
1. PREPARATION
a) General
   (1) Install Work plumb, level, true, and straight without distortions: conceal shims.
   (2) Provide finish Work smooth, free from abrasion, tool marks, raised grain mark markings, or similar defects on exposed surfaces.
   (3) Cut Work to fit unless specified to be shop fabricated or shop cut to exact size. Where carpentry and millwork abuts other finished Work, scribe and cut for accurate fit. Drill pilot holes at corners before making cut-outs.
   (4) Distribute defects allowed in quality grade specified to best overall advantage when installing job assembled Work.

2. INSTALLATION.
   a) Hardware: Install where indicated in accord with particular hardware specialty manufacturer's installation instructions.

3. CLEANING
   a) Clean wood, metal, and accessory items using neutral cleaner. Check and correct operating mechanisms for proper operation. Adjust and lubricate hinges, catches, and other operating hardware.

4. PROTECTION
   a) Protect finished and prefinished surfaces from Work of other trades.
   b) Prior to Date of Completion, examine Work for damage. Repair or replace damaged areas to original condition.

END OF SECTION 06 20 00 - FINISH CARPENTRY
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SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Interior standing and running trim.
   2. Shelving and clothes rods.

B. Related Requirements:
   1. Section 01 7329 "Cutting and Patching" for removal, reuse and patching of existing materials.
   2. Section 02 4119 "Selective Demolition" for salvaging existing items to be reused or recycled and coordination of service interruptions.
   3. Section 06 1000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.
   4. Section 09 9123 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
   1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL
A. Low-Emitting Materials: Composite wood products shall comply with the testing and product requirements of the California Department of Health Services’ “Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.”

2.2 INTERIOR TRIM

A. Existing Molding to be removed, salvaged and reused where possible.

1. Base:
   a. Clean, sand and prepare existing wood trim for reuse. Remove any nails or protruding objects, fill holes, re-cut mitered ends where damaged or not plumb.
   b. Do not reuse molding that is broken, split or does not match molding size or profile of unit.

2. Door Casing and Trim:
   a. Clean, sand and prepare existing wood trim for reuse. Remove any nails or protruding objects, fill holes, re-cut mitered ends where damaged or not plumb.
   b. Do not reuse molding that is broken, split or does not match molding size or profile of unit.
   c. Extend Casing and Trim to new thickness of wall or door where existing molding is installed at new work.

B. New Moldings: Match existing wood molding profile and size. Wood moldings to be made from kiln-fired stock and graded under WMMPA WM 4. Lumber Trim for Opaque Finish (Painted Finish):

1. Base:
   a. Size: Match existing (11/16” x 2 ¼”)
   b. Pattern: Match existing (WM 324)

2. Door Casing and Trim:
   a. Size: Match existing (11/16” x 2 ¼”)
   b. Pattern: Match existing (WM 452)

3. Finger Jointing: Allowed
4. Face Surface: Surfaced smooth

2.3 SHELVING AND CLOTHES RODS

A. Closet Shelving: Made from the following materials:

1. MDF with radiused front edge, ¾” thickness, length and depth as indicated on drawings, or
2. Ventilated Wire Shelving and Rod System, Basis-of-Design: Rubbermaid Shelf and Rod 30000, length and depth as indicated on drawings.

B. Shelf Cleats: 3/4-by-3-1/2-inch boards softwood lumber trim for painted finish.

C. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.


2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Health Services’ “Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.”
PART 2 - FABRICATION

2.5 FABRICATION

A. Back out or kerf backs of the following members except those with ends exposed in finished work:
   1. Interior standing and running trim except shoe and crown molds.

B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces, sizes, or patterns.

B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
1. Install trim after gypsum-board joint finishing operations are completed.
2. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 SHELVING AND CLOTHES ROD INSTALLATION

A. Cut shelf cleats at ends of shelves about 1/2 inch less than width of shelves and sand exposed ends smooth.

B. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled. Space fasteners not more than 16 inches. Use 2 fasteners at each framing member or fastener location for cleats 4 inches nominal in width and wider.

1. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing. Remove adhesive that is squeezed out after fastening shelf cleats in place.

C. Install shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches o.c. Fasten to framing members, blocking, or use toggle bolts or hollow wall anchors.

D. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on cleats, brackets, and supports.

1. Fasten shelves to cleats with finish nails or trim screws, set flush.
2. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

E. Install rod flanges for rods as indicated. Fasten to shelf cleats, framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Install rods in rod flanges.

F. Follow Manufacturer’s detailed component specifications and installation instructions when providing Ventilated Wire Shelving systems.

3.6 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.7 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

3.8 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION
SECTION 06 41 00 – ARCHITECTURAL WOOD CASEWORK

A. PART 1 GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
   b) Section 06 10 00 - Rough Carpentry.
   c) Section 06 20 00 - Finish Carpentry.
   d) Section 07 92 13 - Sealants and Caulking.
   e) Section 09 20 00 - Gypsum Board Systems.
   f) Section 06 05 60 – Decorative Plastic Laminates

2. REFERENCES
   a) Standards of the following as referenced:
      (1) American National Standards Institute (ANSI).
      (2) American Woodworking Institute (AWI).
      (4) National Electrical Manufacturer's Association (NEMA).
      (5) National Kitchen Cabinet Association (NKCA).
   b) Industry Standards:
      (2) NBS: PS-51: Hardwood and Decorative Plywood.

3. SUBMITTALS
   a) Mock-up: Submit one (1) full-size, 18-inch wide base cabinet illustrating construction and material proposed for the project, including countertop with backsplash, end splash, and finished end.
   b) Shop Drawings:
      (1) Indicate elevations, section, and layouts of individual items. Show all dimensions.
      (2) Take field dimensions at each unit where critical prior to fabrication of Work for cabinets.
      (3) Take field dimensions for countertops at each individual unit; verify for proper length and fit.
      (4) Indicate all materials and methods of construction.
   c) Product Data: Include cabinet manufacturer's material list and construction specification, including hardware and finishes.
   d) Color samples: Submit cabinet colors for color selections by Owner's Representative.
   e) LEED documentation

4. DELIVERY, STORAGE AND HANDLING
   a) Deliver cabinet work to project site in manufacturer's protective packaging and only after building is enclosed, finished, and ready for cabinet installation. Storage of cabinet Work at project site is prohibited.
   b) Store equipment in packaging to prevent soiling or physical damage.
   c) Handle items to prevent racking or warping of cabinets, and damage to finished surfaces and operating mechanisms. Repair or replace damaged Work.

5. PROJECT CONDITIONS
   a) Protection: Protect prefinished surfaces from damage or staining. Provide protective covering for equipment following installation until Date of Completion.

6. WARRANTY
   a) Furnish manufacturer's standard cabinet warranty as part of Project Closeout Documents.

B. PART 2 PRODUCTS

1. MANUFACTURERS
   a) Product Spec:
      (1) Manufacturer: Lanz or other manufacturer producing equal quality products.
      (2) Door Type: Flat panel or Shaker style.
      (3) Frame: ¾ " solid hardwood – glued and screw doweled.
      (4) Finish: Thermafoil, color TBD.
      (5) Hinges: Concealed, 110 degree 6-way adjustable.
      (6) Drawer guides: Side mounted, 75# capacity with mechanism that prevents easy pull-out.
      (7) Shelves: Adjustable on upper and lower cabinets.
      (8) Interior: Maple print or white melamine interior.
      (9) Finished Ends: Thermafoil, color TBD.
      (10) Shelf supports: metal pins drilled in.
   b) Substitutions: Under provisions of Section 01 25 00 - Product Options and substitutions.

2. CUSTOM MANUFACTURED UNITS
   a) Provide shop drawings and details for Owner's Representative's approval.
3. FABRICATION
   a) Shop Assembly:
      (1) General Construction: Provide cabinets fabricated with all wooded jointed and glued
construction.
      (2) Fabricate items of woodwork in mill as far as practical. Where countertops cannot be furnished
in single length, join using “Tite-Joint” fasteners.
      (3) Provide joints at logical break points for items which cannot be manufactured in one piece; note
joints on shop drawings.
      (4) Scribe, miter and accurately join work.
   b) Shop Finishing:
      (1) Provide finish work smooth, free from abrasion, tool marks, raised grain, and other grade
prohibited defects on exposed surfaces.

C. PART 3 EXECUTION
1. EXAMINATION
   a) Inspect each unit before installation of work for suitable substrate and square and plumb walls under
this Section. Notify Contractor, in writing, of unsatisfactory conditions. Proceeding with installation of
work under this Section indicates acceptance of substrate.

2. INSTALLATION
   a) Cabinets
      (1) Install cabinets plumb, level and true to line; secure to floor and wall surfaces in accordance with
reviewed shop drawings. Scribe work to adjacent surfaces.
      (2) Coordinate work with installation of work of other trades required to be built into cabinets.
   b) Countertops:
      (1) Install countertops plumb, level and true to line; secure to cabinets and wall surfaces in
accordance with reviewed shop drawings. Scribe work to adjacent surfaces.
      (2) Coordinate work with installation of work of other trades required to be built into cabinets.
      3) Shop Fabrication
         (i) Where countertops cannot be furnished in single length, join using industry standard materials.
Granite at joined materials to match as closely as possible.
      (4) Provide joints at logical break points for items which cannot be manufactured in one piece: note
joints on shop drawings.
      (5) Scribe, miter, and accurately join Work.
   b) Shop Finishing
      (1) Finish millwork items in accord with finishing requirements of Painting section.
      (2) Provide finish Work smooth, free from abrasion, tool marks, raised grain, and other Grade
prohibited defects on exposed surfaces.
   c) Tolerances: Fabricate millwork items to AWI Custom Grade unless otherwise indicated.

3. PROTECTION
   a) Protect finished surfaces from damaged or staining resulting from subsequent work. Repair or replace
damaged cabinetwork, including warped or loose members.

END OF 06 41 00 – ARCHITECTURAL WOOD CASEWORK
SECTION 06 41 93 – CASEWORK HARDWARE

A. PART 1 GENERAL
1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
   b) Section 06 10 00 - Rough Carpentry.
   c) Section 06 20 00 - Finish Carpentry.
   d) Section 09 20 00 - Gypsum Board Systems.
   e) Section 06 41 93 - Architectural Casework
2. REFERENCES
   a) Standards of the following as referenced:
      (1) American National Standards Institute (ANSI).
      (2) American Woodworking Institute (AWI).
      (4) National Electrical Manufacturer's Association (NEMA).
      (5) National Kitchen Cabinet Association (NKCA).
   b) Industry Standards:
      (2) NBS: PS-51: Hardwood and Decorative Plywood.
3. SUBMITTALS
   a) Mock-up: Submit one (1) full-size piece of hardware installed on cabinet (see cabinet submittal) to Architect or Owner's Representative.
   b) LEED documentation
4. DELIVERY, STORAGE AND HANDLING
   a) Deliver to project site in manufacturer's protective packaging and only after building is enclosed, finished, and ready for installation.
   b) Store equipment in packaging to prevent soiling or physical damage.
   c) Handle items to prevent damage to finished surfaces.
5. PROJECT CONDITIONS
   a) Protection: Protect finished surfaces from damage or staining. Provide protective covering for equipment following installation until Date of Completion.
6. WARRANTY
   a) Furnish manufacturer's standard warranty as part of Project Closeout Documents.

B. PART 2 PRODUCTS
1. MANUFACTURERS
   a) Product Spec:
      (1) Manufacturer: Lanz standard 3” long wire pulls or equal quality product.
   b) Substitutions: Under provisions of Section 01 25 00 - Product Options and substitutions.

C. PART 3 EXECUTION
1. EXAMINATION
   a) Inspect each unit before. Notify Contractor, in writing, of unsatisfactory conditions. Proceeding with installation of work under this Section indicates acceptance of materials.
2. INSTALLATION
   a) Door Hardware
      Make sure level and true.
3. PROTECTION
   a) Protect finished surfaces from damaged or staining resulting from subsequent work. Repair or replace damaged work.

END OF 06 41 93 – CASEWORK HARDWARE
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formcove Engineered Composites:
   1. Stand Alone Tubs
   2. Shower Bases
   3. Shower Base Thresholds
   4. Tub & Shower Wall Panels
   5. Accessories

1.2 RELATED SECTIONS

A. Section 04410 – Cultured Marble
B. Section 06 61 13 – Cultured Marble Fabrication
C. Section 06 20 00 - Finish Carpentry
D. Section 06 41 00 - Architectural Wood Casework
E. Section 10 28 16 - Bath Accessories
F. Section 12 30 00 - Casework G. Section 12 36 00 – Countertops
H. Section 22 40 00 – Plumbing fixtures
I. Section 22 41 16 – Residential Lavatories and Sinks
J. Section 22 41 19 – Residential Bathtubs
K. Section 22 41 23 – Residential Showers

1.3 REFERENCES

A. ANSI Z 124.3 - Plastic Lavatories.

1.4 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit manufacturer's product data including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details indicating dimensions, sizes, installation details, attachment provisions, and coordination requirements with adjacent work.

D. Samples: Submit manufacturer's 4-inch by 4-inch samples of engineered marble for each color specified, showing material thickness and finish. Indicate full range of colors and patterns.

E. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

F. Maintenance Data: Submit manufacturer's care and maintenance recommendations, including recommended repair and cleaning instructions.

G. Warranty: Submit manufacturer's standard commercial warranty.
1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Sufficient plant facilities to provide quality, quantities, shapes, and sizes of engineered marble units required without delaying progress of the Work. 2. Minimum of 20 years experience in producing engineered composite products.

B. Installer Qualifications: Experienced installer who has demonstrated successful installation of engineered marble or cast polymer products similar to that specified.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and individual unit number.

B. Storage: Store materials flat in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation in accordance with manufacturer's instructions.

1.7 SCHEDULING

A. Schedule and deliver engineered composite units when ready for installation.

PART 2 PRODUCTS

A.1.1 MANUFACTURER

A. FormCove (Bernalillo, NM) or Equal

2.2 ENGINEERED COMPOSITE

A. Material: Engineered granite

B. Compliance:

1. ANSI Z 124.3.

2. [ASTM E 84] [ASTM E 84, Class I].

C. Performance Requirements: ANSI Z 124.3.

1. Color Fastness: No changes, 200 hours.

2. Wear and Cleaning: Passes.

3. Impact Resistance: No cracks or chips.


D. Fabrication:

1. Mix clean aggregate filler with polyester resin to create a matrix.

2. Add colorants to matrix in a manner to provide veining to mimic appearance of natural marble products.
3. Pour material into molds behind gel coat
4. Allow to fully cure to a solid material.
5. Coat finished engineered marble units with protective wax.
6. Provide consistent color throughout depth of material, not just the surface.

E. Gel Coat Thickness: 25 mils average.
F. Minimum Thickness: Blocks, plugs, or other devices placed in molds to reduce specified thickness of load bearing surface(s) are not allowed.

2.3 SHOWER BASES
A. Size: As indicated on the drawings
B. Thickness: 3/4 inch minimum.
C. Color: to be determined by Architect.
D. Finish: Molded with textured nonslip finish.

2.4 SHOWER THRESHOLDS
A. Width: As indicated on the drawings.
B. Color: to be determined by Architect.

2.5 TUB AND SHOWER WALL PANELS
A. Size: As indicated on the drawings.
B. Thickness: [3/8 inch] [3/4 inch].
C. Color: to be determined by Architect.
D. Accessories:
   1. Panel Adhesive: Clear or color-matched 100 percent silicone panel adhesive.
   2. Sealant: Clear or color-matched 100 percent silicone sealant.

PART 3 EXECUTION

3.1 EXAMINATION
A. Examine surfaces to receive engineered marble units. Notify Architect if surfaces are not acceptable. Do not begin installation until unacceptable conditions have been corrected.
B. Examine engineered composite units before installation. Do not install unacceptable units.

3.2 INSTALLATION
A. Install engineered composite units in accordance with manufacturer's instructions.
B. Install engineered composite units level, plumb, square, and in proper alignment.
C. Make field cuts as necessary from unfinished bottom side in accordance with manufacturer's instructions.
D. Form field joints using manufacturer's recommended adhesive.
E. Fasten vanity tops to cabinets using 100 percent silicone-based adhesive.
F. Attach separate backsplashes and side splashes to vanity tops in accordance with manufacturer's instructions.
G. Do not excessively tighten faucet fixtures or sink drains on bathroom vanities.

Hand tighten sink drains in accordance with manufacturer's instructions.

H. Do not allow hot water temperature over 140 degrees F to come into contact with engineered composite units.

I. Repair nicks, scratches, and other minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

J. Remove and replace damaged units that cannot be successfully repaired as determined by Architect.

3.3 CLEANING

A. Clean and polish engineered composite units promptly after installation in accordance with manufacturer's instructions.

B. Do not use abrasive or harsh cleaning materials or methods that would damage finish.

C. Protect Finish from damage until job completion using plastic wrap, cardboard or a soft cloth.

3.4 PROTECTION

A. Protect installed engineered composite units from damage for duration of project.
SECTION 07 92 13 – ELASTOMERIC JOINT SEALANTS (CAULKING)

A. PART 1 GENERAL

1. REFERENCES
   a) Standards of the Following as Referenced:
      (1) American Society for Testing and Materials (ASTM)
      (2) Federal Specifications (Fed. Spec.)
      (3) Sealant and Waterproofer’s Institute (SWI)
   b) Industry Standards:
      (1) SWI: Association quality standard guidelines for sealant installation.

2. DEFINITIONS
   a) Terms:
      (1) Caulk: Process of filling joints, without regard to type of material.
      (2) Caulking compound: Material used in filling joints and seams, having properties of adhesion and cohesion: not be required to have extensibility and recovery properties, usually applied to joints at interior of structures.
      (3) Joint failure: Caulked joint exhibiting one or more of the following characteristics:
         (a) Leaks air or water.
         (b) Sealant:
            (i) migrates
            (ii) loses adhesion or cohesion
            (iii) does not cure
            (iv) discolors
            (v) stains adjacent Work
            (vi) develops bubbles, air pockets, or voids.
      (4) Sealant: Weatherproof elastomer used in filling and sealing joints, having properties of adhesion, cohesion, extensibility under tension, compressibility, and recovery: designed to make joints air and watertight. Material is designed generally for application to joints at exterior of structures and for other joints subject to movement.

3. SUBMITTALS
   a) Product data: Submit manufacturer's product description indicating conformance with specified requirements and installation instructions for each type sealant. Indicate preparation requirements for each substrate condition.
   b) Color Samples:
      (1) Submit samples of manufacturer's standard caulking material colors and special colors indicated at least 30 days prior to application.
      (2) Samples: Actual materials or literature depicting actual material colors. Owner's Representative reserves right to reject Work not in accord with selected colors, based upon samples submitted.
      (3) Should Owner's Representative select manufacturer meeting specified requirements, except for minimum color range requirements, he shall be responsible for furnishing special colors within color range requirements. Submit special colors for Owner's Representative acceptance.
      (4) LEED submittals.

4. PROJECT CONDITIONS
   a) Weather Conditions:
      (1) Installation of materials under adverse weather conditions is prohibited: install only within manufacturer recommended temperature range.
      (2) Proceed with Work only when forecasted weather conditions are favorable for joint cure and development of high early bond strength.
      (3) Install materials only when temperatures are in lower third of manufacturer's recommended installation temperature, wherever joint width is affected by ambient temperature variations.

5. WARRANTY
   a) Warranty Work to be free from defects in materials and workmanship, including joint failure, for one year period: begin at Date of Completion.

B. PART 2 PRODUCTS

1. MATERIALS
   a) Polyurethane (Type 1 Sealant):
      (1) One-part conforming to FS TT-S-00227E, Class A, Type I (self-leveling) and ASTM-9200.
      (2) Color: As selected by Owner.
      (3) Acceptable products:
         (a) Urexpan NR-201, Pecora.
         (b) Sonolastic SL-1, Sonneborn.
         (c) Vulkem 45, Mameco.
   b) Silicone, General Purpose (Type 2 Sealant):
      (1) One-part rubber based silicone conforming to FS TT-S-001543, Class A, Type II and ASTM C-920.
2. ACCESSORIES

a) Joint Cleaner: Type recommended by sealant manufacturer for substrates indicated.

b) Joint Primer/Sealer: Type recommended by sealant manufacturer for conditions encountered.

c) Bond Breaker Tape: Plastic tape applied to contact surfaces where bond to substrate or joint filler must be avoided for sealant material performance.

d) Sealant Backer Rod: (if required)

(1) Type: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, or neoprene foam: open or closed cell: type recommended by sealant manufacturer for compatibility with material.

(2) Provide size and shape of rod to control joint depth, break bond at joint bottom, form optimum shape of bead on back side, and minimize possibility of extrusion when joint is compressed.

e) Tooling Agent: Agent recommended by sealant or caulk manufacturer to ensure contact of material with inner joint faces.

f) Divider Strips: Synthetic rubber or closed cell synthetic foam not less than 1/16" thick and full depth of caulking material: approved by manufacturers of dissimilar materials as being compatible with each other.

C. PART 3 EXECUTION

1. PREPARATION

a) Protection of Adjacent Surfaces:

(1) Protect by applying masking material or manipulating application equipment to keep materials in joint. Allowing tape to touch cleaned surfaces to receive sealant if masking materials are used is prohibited.

(2) Remove misapplied caulking materials from surfaces using solvents and methods recommended by manufacturer.

(3) Restore surfaces to original condition and appearance where caulking materials have been removed.

b) Surface Protection:

(1) Clean joint surfaces immediately before caulking joints. Remove dirt, insecure coatings, moisture, and other substances interfering with bond.

(2) Etch concrete and masonry joint surfaces to remove alkalinity, unless caulking material manufacturer's product data indicates alkalinity does not interfere with bond and performance.
Etch with sealant manufacturer’s recommended materials in accord with sealant manufacturer’s reviewed installation instructions and product data.

(3) Roughen joint surfaces on vitreous coated and similar non-porous materials, unless caulking material manufacturer’s data indicates equal bond strength as porous surfaces. Rub with fine abrasive cloth or wool to produce dull sheen.

2. APPLICATION
   a) General: Comply with sealant material manufacturer’s printed installation instructions, except where more stringent requirements are required, indicated, or specified.
   b) Primer: Prime or seal joint surfaces where recommended by caulking material manufacturer. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.
   c) Backer Rod: Install for all caulking materials, except where recommended to be omitted by material manufacturer for application when needed.
   d) Sealant:
      (1) Employ installation techniques which will insure caulking materials are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces.
      (2) Fill joint to form slight cove, so joint will not trap moisture and debris where horizontal joints are between horizontal and vertical surface.
      (3) Do not allow materials to overflow or spill onto adjacent surfaces. Use masking tape or other precautionary devices to prevent staining of adjacent surfaces.
      (4) Remove excess and misplaced materials as Work progresses. Clean adjoining surfaces to eliminate evidence of misplaced materials, without damage to adjacent surfaces or finishes.
      (5) Cure caulking materials in accord with manufacturer’s product data to obtain high early bond strength, internal cohesive strength, and surface durability.

3. SCHEDULE
   a) Sealant Type And Application
   b) Type 1
      (1) Horizontal control and expansion joints in concrete flooring and pedestrian paving and at junctures between these materials and other adjacent materials.
   c) Type 2
      (1) Sealing of joints between plumbing fixtures and substrates and between plastic laminate splashes and adjacent tops and walls.
   d) Type 3
      (1) General caulking as part of interior painting in joints subject to movement.
   e) Type 4
      (1) Sealing joints between countertops and substrates in kitchen and elsewhere which may be in contact with food.
   f) Type 5
      (1) General caulking as part of interior painting.
   g) Type 6 or 8
      (1) Setting sill plates to slabs.
   h) Type 7
      (1) Control joints in masonry work and at juncture between masonry work and adjacent materials.
      (2) Sealing around perimeter of all windows, doors, and other items penetrating exterior siding.

END OF SECTION 07 92 13 – ELASTOMERIC JOINT SEALANTS (CAULKING)
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SECTION 08 71 00 - DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes hardware for wood and steel doors,
   1. Provide door gaskets, including weatherstripping and seals, and thresholds.

B. Related Sections:
   1. Section 08 1100 - Steel Doors and Frames.
   2. Section 08 1416 - Flush Wood Doors.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A156.1 - Butts and Hinges.
   2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
   3. ANSI A156.3 - Exit Devices.
   4. ANSI A156.4 - Door Controls - Closures.
   5. ANSI A156.5 ANSI A156.6 - Architectural Door Trim.
   6. ANSI A156.7 - Template Hinge Dimensions.
   7. ANSI A156.12 - Interconnected Locks and Latches.
   8. ANSI A156.13 - Mortise Locks and Latches.
   9. ANSI A156.14 - Sliding and Folding Door Hardware.
  10. ANSI A156.15 - Closer Holder Release Devices.
  11. ANSI A156.16 - Auxiliary Hardware.
  12. ANSI A156.18 - Materials and Finishes
  13. ANSI A156 - Complete Set of 24 BHMA Standards (A156 Series) with Binder.

B. Builders Hardware Manufacturers Association:
   1. BHMA Directory of Certified Products.

C. National Fire Protection Association:

D. Underwriters Laboratories Inc.:
   1. UL 10B - Fire Tests of Door Assemblies.
   2. UL 305 - Panic Hardware.

E. Intertek Testing Services (Warnock Hersey Listed):
   1. WH - Certification Listings.

1.3 PERFORMANCE REQUIREMENTS

A. Fire Rated Openings: Provide door hardware listed by UL or Intertek Testing Services (Warnock Hersey Listed), or other testing laboratory approved by applicable authorities.
   1. Hardware: Tested in accordance with NFPA 252.

1.4 SUBMITTALS

A. Section 01 3300 - Submittal Procedures: Submittal

   B. Shop Drawings:
      1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
      2. Submit manufacturer's parts lists [ , and templates].
C. Samples:
   1. Upon request submit one sample of typical hinge, latchset, lockset, and closer, illustrating style, color, and finish.
   2. Approved samples may be incorporated into Work.
   3. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS
A. Section 01 7000 - Execution and Closeout Requirements: Closeout procedures.
B. Project Record Documents: Record actual locations of installed cylinders and their master key code.
C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.6 QUALITY ASSURANCE
A. Perform Work in accordance with the following requirements:
   1. ANSI A156 series.
   2. NFPA 80.
   3. UL 305.

1.7 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years [documented] experience.
B. Hardware Supplier: The hardware supplier must have in his/her employment an Architectural Hardware Consultant (AHC), as recognized by the Door And Hardware Institute, with a minimum of 10 years of Architectural Hardware experience or an equivalent person with 15 years of Architectural Hardware experience, who shall be responsible for the detailing, scheduling, and ordering of the finish hardware for this Contract.
C. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND HANDLING
A. Section 01 6000 - Product Requirements: Product storage and handling requirements.
B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.9 COORDINATION
A. Section 01 3000 - Administrative Requirements: Coordination and project conditions.
B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
   1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
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C. Sequence installation to accommodate required utility connections. D. Coordinate Owner's keying requirements during course of Work.

1.10 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds. B.

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 mechanical locksets and cores for a 7 year period.
3. Warranty against mechanical failure of door closers for a 10 year period.
4. Warranty against failure of parts of all hardware except exit devices, locksets, and door closers for a 1 year period.

1.11 MAINTENANCE MATERIALS

A. Section 01 7000 - Execution and Closeout Requirements: Maintenance materials.
B. Furnish special wrenches and tools applicable for each different and for each special hardware component.
C. Furnish maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

A. Hinge Manufacturers:
   1. Residential Doors: By door fabricator.

B. Lockset and Latch Set Manufacturers
   1. Schlage - Basis-of-Design: Dexter J-Series, Marin 630, Brushed Chrome

C. Viewer
   1. Basis-of-Design Taymor 37-B4846, 180 Degree Field of Vision, Satin Chrome

D. Stop:
   2. Hinge Pin Door Stop, Basis-of-Design: Taymor 25-4614, Only use at approved locations, coordinate with Architect prior to installation.

E. Roller Catch:

2.2 COMPONENTS

A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
   1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
   2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
   3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
a. Finish: Match hardware item being fastened.

4. Fire Ratings: Provide hardware with UL or Intertek Testing Services (Warnock Hersey Listed) listings for type of application involved.

5. Electrical Devices: Make provisions and coordinate requirements for electrical devices and connections for hardware.

B. Hinges: ANSI A156.1, full mortise type complying with following general requirements unless otherwise scheduled.

1. Widths: Sufficient to clear trim projection when door swings 180 degrees.

2. Number: Furnish minimum three hinges to 90 inches high, four hinges to 120 inches high for each door leaf.
   a. Fire Rated Doors to 86 inches High: Minimum three hinges.

   b. Doors 42 inches wide and wider: 5 x 4.5 inch extra heavy weight ball bearing.

4. Pins: Furnish non-removable pins (NRP) at exterior and locked outswinging doors, non-rising pins at interior doors.

5. Tips: Flat button tips with matching plug.


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


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

4. 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.

5. Rosettes: Minimum 3-7/16" diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage this pattern.


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

D. Cylinders: ANSI A156.5, Grade 1,

1. Keying: Keyed as directed by Owner. Master keyed, Grand master keyed, Great grand master keyed as directed.

2. All locks shall be supplied with construction cores.

3. Permanent cores shall be keyed/combinated in sets or subsets, master keyed or great grand master keyed, as directed by Owner. Permanent keys and cylinders/cores shall be marked with the applicable blind code for identification. These visual key control marks or codes will not include the actual key cuts.

4. Equip locks and cylinders with 6-pin cylinders. Cylinders must allow for multiplex master keying, combinated to Owner’s instructions.

5. It is the material supplier’s responsibility to de-activate the construction keying and to deliver all permanent key blanks and other security keys direct to Owner’s representative.

6. Cylinder Rings as required at Rim & Mortise cylinders.

7. Keys Required: Furnish quantity of keys as follows:
   a. Five (5) Master Keys
   b. Two (2) keys per lock or cylinder
   c. Two (2) core keys
   d. Fifteen (15) construction keys

8. All keys shall be made of nickel silver.

2.3 ACCESSORIES
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A. Lock and Latch Trim: Furnish lever hardware.
B. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors.
C. Fire Rated Gaskets: Furnish continuous fire rated gaskets at top and sides of fire rated doors.
D. Thresholds: Maximum 1/2 inch height.
   1. Basis-of-design: Pemko 176
E. Wall Stops: ANSI A156.1, Grade 1.

2.4 FINISHING
A. Finishes: ANSI A156.18; furnish following finishes except where otherwise indicated in Schedule at end of section.
B. Hinges:
   1. BHMA 626 or 619, satin finish.
C. Typical Exterior Exposed and High Use Interior Door Hardware:
   1. BHMA 626, satin chromium plated brass or bronze.
   2. BHMA 619, satin nickel finished stainless steel.
D. Typical Interior Door Hardware
   1. BHMA 626, satin chromium plated brass or bronze.
   2. BHMA 619, satin nickel finished stainless steel.

Closers: BHMA 689, satin aluminum, powder coated.

F. Thresholds: BHMA 628, satin aluminum, clear anodized.
G. Other Items: Furnish manufacturer’s standard finishes to match similar hardware types on same door, and maintain acceptable finish considering anticipated use and BHMA category of finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings or instructed by manufacturer.

3.2 INSTALLATION

A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.

3.3 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
B. Adjust hardware for smooth operation.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
B. Do not permit adjacent work to damage hardware or hardware finish.
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3.5 SCHEDULES

A. The following hardware sets are intended to establish type and standard of quality when used together with this section's requirements. Examine Drawings and Specifications and furnish proper hardware for door openings.

1. Dwellings:
   a. Front Entry Door:
      1) Butts.
      2) Latchset, passage function
      3) Deadbolt
      4) Stop
      5) Weatherstripping
      6) Door Sweep
      7) Threshold
      8) Door Viewer
   b. Patio Door:
      1) Butts.
      2) Latchset, passage function
      3) Deadbolt
      4) Stop
      5) Weatherstripping
      6) Door Sweep
      7) Threshold
   c. Exterior Storage Door:
      1) Butts.
      2) Latchset, storeroom function
      3) Weatherstripping
      4) Door Sweep
      5) Threshold
   d. Bedroom Door:
      1) Butts.
      2) Latchset, privacy function
      3) Stop
   e. Bathroom Door:
      1) Butts.
      2) Latchset, privacy function
      3) Stop
   f. Closet (single):
      1) Butts.
      2) Latchset, passage function
      3) Stop
   g. Closet (pair):
      1) Butts.
      2) Dummy trim
      3) Roller catch
      4) Stop

END OF SECTION
SECTION 08 83 00 - MIRRORS

A. PART 1 - GENERAL
1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Glass for unframed mirrors.
   b) Glazing accessories.

3. DELIVERY, STORAGE, AND PROTECTION
   a) Deliver, store, handle, and protect products under provisions of Section 01 65 00 – Product Delivery Requirements and 01 66 00 Product Storage and Handling Requirements.

4. FIELD MEASUREMENTS
   a) Verify that field measurements are as indicated on shop drawings.

5. WARRANTY
   a) Provide warranty under provisions of Section 01 78 33/36 - Warranties/Bonds.
   b) Warranty: Include coverage for reflective coating on mirrors and replacement of same.
      (1) Warranty period: Five (5) years from date of completion.

B. PART 2 - PRODUCTS
1. ACCEPTABLE GLASS MANUFACTURERS
   a) Pittsburgh Plate Glass (P.P.G.)
   b) Libby Owens Ford (L.O.F.)
   c) Newcastle Glass
   d) Spectrum Glass Products.
   e) Substitutions: Under provisions of Section 01 25 00 - Product Options and Substitutions.

2. GLASS MATERIALS
   a) Unframed Mirrors
      (1) ASTM C1036, mirror select quality, 3/16" clear plate. Backs shall have 2 coats of silver hermetically sealed, complying with GS-27, with an impervious protective coating of copper deposited over silver by electrolysis, and finished with a special composition hard, mirror-backing paint. Mirrors shall bear manufacturer's labels. Mirrors shall have ground and polished edges.
      (2) Mirror Anchors: Continuous metal clip channels on bottom and mirror clips on top.

3. MIRROR SIZE: See interior elevations at all residential units

C. PART 3 - EXECUTION
1. GENERAL
   a) Comply with manufacturers' recommended installation procedures and as outlined herein.
   b) Prevent nicks, abrasions and other damage likely to develop stress on edges.

2. GLASS MIRRORS
   a) Position mirror on top of back splash.
   b) Do not seal off ventilation space at edge of mirror.

3. CLEANING
   a) Clean all surfaces of glazing materials, mortar, plaster, paint and other soiling or contaminate.
   b) Remove labels after work is completed.
   c) Wash and Polish both faces not more than one week prior to Owner's acceptance of work.
   d) Replace broken, scratched, shipped, or otherwise damaged glass.

END OF SECTION 08 83 00 - MIRRORS
SECTION 09 20 00 – PLASTER AND GYPSUM BOARD SYSTEMS

A. PART 1 - GENERAL

1. SUMMARY
   A) Related Sections
      (1) Section 06 10 00: Rough Carpentry
      (2) Section 06 20 00: Finish Carpentry
      (3) Section 07 21 00: Building Insulation
      (4) Section 09 90 00: Painting

2. REFERENCES
   A) Standard of the Following as Referenced
      (1) American National Standards Institute (ANSI)
      (2) Federal Specification (Fed. Spec.)
      (3) Gypsum Association (GA)
      (4) Underwriters’ Laboratories, Inc. (UL)

3. SYSTEM DESCRIPTION
   A) Design Requirements
      (1) Fire resistance ratings: Construct designated walls and ceilings in accord with indicated UL design numbers or other approved association numbers.

4. PRODUCT STORAGE, AND HANDLING REQUIREMENTS
   A) Storage PER SECTION 01 66 00
      (1) Stack gypsum board providing continuous support for gypsum board to prevent sagging. Stack gypsum board in manner to prevent long lengths over short lengths. Stock per perpendicular to trusses on floors.
      (2) Store adhesives in dry area: provide protection against freezing at all times.
      (3) Do not overload floor system.

5. PROJECT CONDITIONS
   A) Install gypsum board only after building is enclosed, except for pre rock conditions as required by plans, local codes and ordinances.
   B) Ventilation:
      (1) Provide ventilation during and following adhesive and joint treatment application.
      (2) Use temporary air circulators in enclosed areas lacking natural ventilation.
      (3) Allow additional drying time between coats of joint treatment, under slow drying conditions.
      (4) Protect installed materials from drafts during hot, dry weather.
   C) Texture: Owner's Representative must approve condition of taping joints prior to application of texture.

6. SUBMITTALS
   A) Submit under provisions Section of 01 25 00 - Submittals.
   B) Submit two 2' x 2' texture samples for Owner approval.
   C) LEED submittal.

B. PART 2 - PRODUCTS

1. MANUFACTURERS
   A) Acceptable manufacturers: Products of the following manufacturers are acceptable for use except certain manufacturer's products may be required for use in particular rated assemblies. Those rated products ONLY are acceptable for use.
      (1) Georgia-Pacific Corp.
      (2) Gold Bond Building Products/National Gypsum Company
      (3) U.S. Gypsum Company
      (4) Dens Glass Sheathing by Georgia Pacific
      (5) Approved Equal

2. COMPONENTS
   A) Gypsum Board
      1) Regular gypsum board: Meeting ASTM C36-85 and Fed. Spec. SS-L-30D, Type III, Grade R, Class 1 forms A and C: thicknesses indicated, tapered edges.
      3) Special rated gypsum board:
         (a) Acceptable product: U.S. Gypsum Company: Sheetrock Firecode and Firecode "C".
         (b) Characteristics:
            (i) Thickness: 5/8"
            (iii) Specially formulated Type X core to achieve superior performance when used in specific fire rated assemblies of UL, GA, FM, WHI, and other code recognized testing laboratories or agencies and indicated in specific test reports generally as "....proprietary type X....".
c) Gypsum board: per structural plans.
   1) Sound Control Materials: Specified in Building Insulation section.
   2) Fire-rated Insulation for Rated Assemblies: Specified in Building Insulation section.
   3) Gypsum Area Wall Separation (Fire Wall)
      Acceptable manufacturers:
      (i) Georgia-Pacific Corp.
      (ii) Gold Bond Building Product/National Gypsum Company
      (iii) U.S. Gypsum Company
   4) UL system fire resistive rating: Indicated on drawings.
   5) Water-resistant Dens Glass sheathing - Meeting ASTM D 3273 test. Rigid substrate for a wide variety of
      air or water resistive barrier systems. Fire rated and non-fire rated. Gypsum sheathing: per structural plans.
      a) Sound Control Materials: Specified in Building Insulation section.
      b) Fire-rated Insulation for Rated Assemblies: Specified in Building Insulation section.
      c) Gypsum Area Wall. Wet locations, as per plan and exterior portal ceilings.
         (1) Acceptable manufacturers:
            (i) Georgia-Pacific Corp.
   6) Water-resistant gypsum board: Meeting ASTM C630-85 and Fed. Spec. SS-L-30D, Type VII,
      Grade W or X, Class 2: thickness indicated, Regular and Type X, tapered edges.
   d) Fasteners
      (1) Screws for gypsum board application :
         (i) Application of single layer of gypsum board to wood framing: Meet ASTM C1002-83.
            Type W. 1-1/4" length, bugle head.
         (ii) Gypsum board to gypsum board application: Meet ASTM C1002-83, Type G, 1-1/2"
            bugle head.
         (iii) Applications not listed: Conform to gypsum board manufacturer's product literature
            for conditions encountered.
   e) Joint Materials and Adhesives
         base, ready-mixed tape embedment and topping compounds.
   f) Accessories
      1) Corner reinforcement: Galvanized steel with 1-1/4" wide flanges, similar to U.S.
         Gypsum Company Dur-A-Bead #103.
      2) Metal jamb, ceiling, and casing trim: Manufacturer's standard "U" and "L" shaped
         galvanized member providing edge protection and neat finished edges: similar to U.S.
         Gypsum Company, 200-A and 200-B, respectively.
      3) Resilient channel: Minimum 25 gauge galvanized steel: manufacturer's standard type:
         similar to U.S. Gypsum Company, RC-1 Resilient Channel.
      4) J-metal base. Types approved by Owner's Representative for intended use.
   g) Texture
      1) Owner's Representative shall approve condition of taping joints prior to application of
         texture.
      2) Ceilings: See plans and as approved by Owner's Representative.
      3) Walls: See plans and as approved by Owner's Representative.

C. PART 3 - EXECUTION

1. INSTALLATION
   A) Furring: Attach resilient channels to all locations drawings specify, at spacings required in accord with
      requirements of tested and rated assembly indicated.
   B) Gypsum Board -- General:
      1) Install gypsum board in accord with manufacturer's product data, GA-216-85, and ASTM C840-
         87, except where more stringent requirements are specified.
      2) Use gypsum board of maximum lengths to minimize end joints. Stagger end joints.
      3) Abut gypsum board without forcing. Fit ends and edges of gypsum board. Do not place butt
         ends against tapered edges.
      4) Support ends and edges of gypsum board panels on framing or furring members.
      5) Install gypsum board accessories in accord with gypsum board manufacturer's data.
      6) Smoke barriers: Construct at locations indicated. Seal all terminations and penetrations
         required by City.
   C) Gypsum Board -- Single Layer Installation
      (1) Ceilings:
         (a) Apply gypsum board with long dimension at right angle to framing or RC channel.
         (b) Terminate ends and edges of gypsum board on furring members.
         (c) Attach in accord with requirements for tested and rated assemblies as indicated.
(d) For two-layer system, refer to USG Gypsum Construction Handbook.

(2) Walls:
   (a) Apply gypsum board horizontally or approved design.
   (b) Stagger end joints in opposite sides of partitions.
   (c) Terminate gypsum board ends on framing or furring members.

(3) Fastening per code.

D) Gypsum Board Joint Treatment
1) Apply joint compound to joints and angles in gypsum board and embed joint tape. Apply two additional coats of compound over tape, allow drying between coats, featheredge and sand or damp sponge smooth each coat.
2) Walls: Apply three coats compound, minimum, over fastener depressions: sand or damp sponge smooth each coat: bring to level plane of gypsum board surface.
3) Apply minimum of two coats of compound over fastener depressions at all ceilings, sand or damp sponge smooth both coats. Leave ready for texturing as specified by Owner’s Representative.
4) Fastener pop:
   (a) Repair fastener pop by installing second fastener approximately 1-1/2” from fastener pop and reseat fastener.
   (b) Where face paper is punctured, drive new fastener approximately 1-1/2” from defective fasteners and remove defective fastener.
   (c) Fill damaged surface with compound and sand or damp sponge smooth to level of plane of gypsum board.
5) Fill cracks with compound: sand or damp sponge smooth and flush.
6) Dust surfaces leaving ready for decoration.

E) Floor/Wall Joint
1) Install j-metal trim ¼” off finished floor materials at all floor / wall joints and per manufacturers recommendations and as approved by Owner’s Representative.

F) Texture
1) Install per manufacturers recommendations and approval of Owner’s representative.

END SECTION 09 20 00 – PLASTER AND GYPSUM BOARD SYSTEMS
Part 1 - General

1.01 SUMMARY

A. Section Includes: Installation of the Portland cement stucco as an exterior wall cladding. The extent of stucco base and finish coat assembly is as indicated on the drawings. This system is to be mechanically attached over CMU, Studs and Sheathing and ICF.

B. The types of stucco base coat assembly include:
   1. Factory blended, fiber-reinforced cement plaster basecoat for jobsite mixing to provide scratch and brown coats to receive secondary fiberglass crack suppression reinforcement and a cement colored stucco finish.

C. Products installed but not supplied under this section:
   1. Joint Sealant: Refer to Division 7 Joint Treatment (Sealants) Section. Installation of joint sealant shall be by coating applicator or a separate installer. Joint sealant installer shall be experienced and competent in the installation of elastomeric construction sealants.

1.02 DESCRIPTION

A. **Scratch and Brown Concentrate** fiber reinforced stucco that is a factory blended formulation of Portland cement, lime, fibers, and proprietary ingredients. For use with jobsite added ASTM C-897 stucco sand and clean potable water.

B. **Scratch and Brown** Functional Criteria:
   1. Stucco application shall be sloped a minimum of **4"/12" (150)** for positive drainage.
   2. Substrate conditions:
      a. Sheathing substrates shall be sound, dry, and free of dust, dirt, and other contaminants.
      b. Substrate Dimensional Tolerances: Flat with **V4 inch (6.4 mm)** within any 4 foot (1219 mm) radius to maintain a uniform thickness of basecoat material.
      c. Maximum deflection of substrate assembly under positive or negative design loads shall not exceed L/360 of span.

C. Expansion Joints:
   1. Continuous expansion joints shall be installed at all areas of dissimilar materials, multiple story plate lines, or existing engineered through wall expansion joints.
   2. Per ASTM C 1063, "Expansion and or contraction joints shall be installed in walls not more than 144 ft² (9.30 m²) in area and not more than areas of 100 ft² (9.30 m²) for all horizontal applications. The distance between joints shall not exceed 18 ft (5.5m) in either direction or a length-to-width ratio of 2V2 to 1".
   3. Location and frequency of control joints to be detailed by the design professional and shown on drawings when applicable.

1.03 SUBMITTALS

A. General: Applicator to submit:
   1. Manufacturer's technical information including installation instructions and recommendations.
   2. Samples: Submit samples for approval. Samples shall be of materials specified and of suitable size as required to accurately represent each color and texture to be used on project. Prepare each sample using same tools and techniques for actual project application. Approved samples shall be maintained and available at job site.

1.04 QUALITY ASSURANCE
A. Requirements of Regulatory Agencies: Install stucco basecoat assembly to comply with all applicable codes and standards and with requirements of local agencies having jurisdiction.

B. Manufacturer: Shall have marketed stucco products in United States for at least ten years; shall have completed projects of same building size and type as this project.

C. Applicator Qualifications: Applicators specializing in the installation of exterior stucco assembly with a minimum of 5 years experience in work similar to that required by this section.

D. Single Source Responsibility: All stucco base coat and finish materials shall be from a single manufacturing source.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver manufactured materials in original packages or containers, with manufacturer's labels intact and legible.

B. Keep materials dry, above freezing, stored off ground, under cover, and away from damp surfaces. At the time they are mixed, all materials shall be at a minimum temperature of 40° F (40 C).

C. Remove wet, frozen, damaged, or detrimental materials from site immediately.

1.06 PROJECT SITE AND INSTALLATION CONDITIONS

A. Environmental Conditions: Comply with manufacturer's recommendations of environmental conditions affecting product installation requirements.
   1. Installation Ambient Air Temperature: Minimum of 40° F (40 C) and rising, and remain so for 48 hours thereafter. Maximum Ambient Air Temperature of 1200 F (49° C). Protect stucco from uneven and excessive evaporation during hot dry weather.
   2. Do not use frozen materials in cement stucco.
   3. Do not apply cement stucco to frozen surfaces or surfaces containing frost or ice.
   4. Inclement Weather: Do not apply basecoat during inclement weather, unless appropriate protection is employed.
   5. Wall and Substrate Temperatures: Avoid, when possible, installation of the basecoat and the finish coats over substrates that are over 1200 F (490 C).

B. Protection:
   1. Protect adjacent finished surfaces prior to stuccoing.
   2. Maintain protection in place until completion of work.
   3. Protect finished work when stopping for the day or when completing an area.

Part 2 – Products

2.01 MANUFACTURERS

A. Stucco base and finish coats: El Rey Stucco by ParexLahabra/ Inc., 3830 Singer Blvd. NE, Suite 2202, Albuquerque/ New Mexico/ 87109; (888) 463-5789.

B. Lahabra Stucco base and Finish Coats: 4125 East La Palma Ave., Anaheim, California 92807; (714) 778-2266.

2.02 MATERIALS

A. Weather Resistive Barrier:
1. One layer of No. 15 (ASTM D 226-97a) Grade D paper (or equivalent) over all new sheathing substrates; two layers are required over all wood sheathing or as required by current national and local codes.

B. Lath and Trim Accessories: Conform to ASTM C1063 lathing and furring.
   1. Exterior components field walls: Minimum 17 gauge self-furred stucco netting. Expanded metal diamond lath may also be used in accordance with ASTM C897.
   2. Terminations: J-Metal or Stucco stop, general purpose type with expanded or perforated flanges.
   3. Corner Reinforcement: (galvanized welded wire, minimum 18 gauge): Manufacturer's standard pre-formed corner reinforcement made from 1.7 lbs. (0.059 kg/m²) per square yard of diamond mesh lath.
   4. Square Edge Corner Beads: expanded or flanged to suit application. (For square corners.)
   5. Round-Edged Corner Beads: expanded or flanged to suit application. (For rounded corners.)
   6. Control Joints: Single component control joints with \(\frac{1}{4}\) inch slots and \(\frac{3}{4}\) inch grounds, or equal.
   7. Expansion Joints: two piece adjustable expansion joints, free floating adjustments from \(\frac{1}{16}\) inch to \(\frac{5}{8}\) inch.
   8. Weep Screeds: foundation weep screed, with perforations and minimum \(\frac{31}{2}\) inch vertical attachment flange.
   9. Fasteners: steel nail or screw of furring type with 1 inch cap of sufficient length for minimum \(\frac{1}{2}\) inch penetration into brick, block, concrete, or stud system.
   10. 3.4 lb. per square yard expanded metal strip-lath 4 inches wide to be used around all windows, doorways, openings, and through wall penetrations.
   11. 3.4 lb. density expanded metal lath for use on all soffits and overhangs as shown on drawings.

C. Fiber-reinforced Portland cement stucco basecoat: (The following stucco specification was written around El Rey’s proprietary and factory-blended Fiber-47® scratch and brown basecoat assembly. Therefore, all substitution requests must be proven to be of equal quality no less than ten (10) days prior to project bid date.
   1. Fiber-4® Concentrate: Manufacturer’s standard factory formulated, concentrate scratch and brown stucco basecoats consisting of Portland cement, lime, fibers, and proprietary ingredients.

D. Water: Potable.

E. Sand: Comply with all requirements of ASTM C897.

F. Secondary Fiberglass Reinforcement:
   1. Krak-Master® mesh: Manufacturer’s standard woven fiberglass mesh, consisting of alkali resistive treated fiberglass.

G. Finish coat, Cement Stucco:
   1. Premium Colored Stucco®: Colored stucco finish coat, consisting of Portland cement, lime, properly graded aggregate, colorant, and proprietary ingredients.
   2. Fog-Kote®: Colored Fog-coat spray, (as needed for color uniformity) consisting of Portland cement, lime, colorant, and proprietary ingredients.

Part 3  Execution

3.01 INSTRUCTIONS

A. Compliance: Comply with manufacturer’s instructions for installation of base and finish coats.

3.02 INSPECTION

A. Substrate Examination: Examine prior to Fiber-47 installation as follows:
1. Substrate shall be of a type listed in IBC 2003 or as required by local codes and agency's having jurisdiction. Wood based sheathings substrates must be gapped 1/8 inch (3 mm) between panels.
2. Substrate shall be examined for soundness, and/or other harmful conditions.
3. Substrate shall be free of dust, dirt, efflorescence, and other harmful contaminants.
4. Notify contractor of discrepancies preventing installation of the stucco assembly.

B. Verify that weather resistive barrier and flashing is installed in compliance with requirements of applicable codes, regulations, and agencies having jurisdiction.

C. Verify that lath is tight, properly secured, and that all accessories are properly set and secured.

D. Isolation: Where lath and metal support assembly abuts building structure horizontally, and where partition wall work abuts the overhead structure, isolate work from structure movements. Install expansion or control joints to absorb deflections but maintain lateral support. Frame both sides of expansion and control joints separately and do not bridge joints with furring or lath.

E. Examine substrates, grounds, and accessories to insure that finished stucco work will be true to line, plane, level, and plumb.

3.03 PREPARATION OVER MASONRY SUBSTRATES: DIRECT BOND APPLICATIONS
A. Conform to preparation requirements of ASTM C926.

B. Verify that masonry and concrete surfaces to receive direct bond applications of stucco basecoats are rough, free from release agents, or otherwise properly prepared to provide for adequate bond.

C. Apply a uniform coating of the acrylic bonding agent in accordance with manufacturer's recommendations and instructions.

3.04 INSTALLATION
A. General: Apply stucco basecoat assembly in accordance with manufacturer's instructions and recommendations as written in El Rey data sheets, and in compliance with requirements of applicable codes, regulations, and agencies having jurisdiction.

B. Interrupt stucco application only at junctions of stucco planes, at openings, at control joints, or at expansion joints.

C. Basecoat:
1. Apply scratch coat to a thickness of 3/8 inch using sufficient trowel pressure to key stucco into lath or onto direct bond substrate.
2. Scratch horizontally and in order to provide a key with the brown coat.
3. Apply Brown coat directly over scratch coat to a thickness of 3/8 inch (9.5mm), using sufficient trowel pressure to key brown coat into scratch coat.
4. Darby, then rod surface to true plane.
5. While basecoat is still wet, embed secondary fiberglass reinforcement utilizing a wood float, and smooth to flush. Take care to completely embed mesh not more than 1/32 inch into surface of wet brown coat. Overlap all seams 2 inches and remove all wrinkles, rough edges, etc.
6. Float or lightly broom surface to provide bond with cement stucco finish coat.
7. Tool brown coat to provide a V-joint at intersection of stucco with frames or other items of metal, wood, or plastic which act as stucco grounds.

D. Finish Coat: Cement Stucco Finish
1. Apply exterior wall finish coat to thickness recommended by manufacturer to
achieve texture indicated, using sufficient trowel pressure to bond finish coat to basecoat.

2. Apply exterior wall finish in number of coats and consistency required to achieve texture to match approved sample.

3. Colored Fog-Coat: As needed, apply sufficient coats to ensure uniform color and consistency. Let dry, then mist with water 2 times a day for 2 days.

3.05 CURING

A. Moist cure cement base coats and cement stucco finishes with a fog spray of clear water with sufficiently frequent applications to maintain stucco uniformly moist for a minimum of 48 hours following applications.

B. Moist cure cement finish coats a fog spray of clean water in sufficiently frequent applications to maintain stucco uniformly moist for a minimum of 48 hours following applications.

3.06 CLEANING

A. Patching:
   1. Repair damaged exterior wall finish coat to match surrounding finish.

B. Cleanup:
   1. Remove excess finish and protective materials from adjacent surfaces.
   2. Remove all excess materials from the project site. End of
PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes surface cleaning, surface preparation, crack repair of cementitious stucco.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples for Initial Selection: For each type of topcoat product indicated.

1.3 DELIVERY, STORAGE, AND HANDLING
A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.4 PROJECT CONDITIONS
A. Apply primer and patching materials only when temperature of surfaces to be patched and ambient air temperatures are between 50 and 95 deg F.
B. Do not apply priming or patching materials in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg above the dew point; or to damp or wet surfaces.

1.5 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:
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. CTS Cement.
   2. Merlex.
   3. Parex USA.
   4. Sto USA.

1.6 MATERIAL GENERAL
A. Material Compatibility: Provide block fillers, primers, and patching materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
B. Material Quality: Provide manufacturer's best-quality material of the various coating types specified in part 3 that are factory formulated and recommended by manufacturer for application indicated. Material containers not displaying manufacturer's product identification will not be acceptable.
   1. Proprietary Names: Furnish manufacturer's material data and certificates of performance for proposed substitutions.

1.7 PATCHING MATERIALS
A. Exterior Cementitious Patching Compound Materials: Provide cementitious patching compounds and repair materials specifically manufactured for surface preparation and crack repair on vertical and horizontal surfaces prior to repainting. Utilize flexible acrylic modified Portland cement waterproofing
and basecoat for repair of horizontal surfaces:

2. Water based: VOC compliant.
3. Additive/Portland Cement Ratio: Per product manufacturer’s recommendations.
4. Color: Gray
5. Vapor Permeability: 2.5 grams (ASTM E96)
7. Freeze-thaw resistance: 60 cycle, pass (ASTM C67, EIMA 101.01)
9. Width: Install full width of horizontal parapet surface. 4” minimum width at other non-parapet surfaces.

B. Fiberglass Reinforcing Mesh: Provide fiberglass reinforcing mesh embedded into cementitious patch compound material for crack repair on horizontal surfaces.
1. 4.5 oz. per square yard
2. ASDTM D-5035
3. Warp-150, Weft 160
5. Width – Install full width of horizontal parapet surface. 4” minimum width at other non-parapet horizontal surfaces.

1.8 MISCELLANEOUS MATERIALS

A. Detergent Cleaning Solution: Mix 2 cups of tetra sodium polyphosphate, 1/2 cup of laundry detergent, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.

B. Job-Mixed Mold, Mildew, and Algae Remover: Mix 2 cups of tetrasodium polyphosphate, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of hot water for every 5 gal. of solution required.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
3. Wood: 15 percent.
4. Plaster: 12 percent.
5. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

2.2 PREPARATION, GENERAL REQUIREMENT

A. Comply with manufacturer’s written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Prepare existing surfaces as follows:
1. Clean existing surfaces to remove loose dirt and dust.
2. Remove surface films that will prevent proper adhesion.
3. Patch and repair damaged and cracked surfaces.

2.3 SURFACE PREPARATION FOR EXTERIOR CEMENTITIOUS STUCCO

A. Remove efflorescence and chalk. Do not recoat surfaces if moisture content of surfaces or alkalinity exceeds that permitted in manufacturer’s written instructions. Cementitious Materials: Prepare cement panel surfaces to be recoated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze.

1. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not recoat surfaces if moisture content exceeds that permitted in manufacturer’s written instructions.

B. Repair of exterior vertical stucco (wall surface) openings and cracks:

1. Repair of cracks or openings no greater than 1/32” wide:
   Apply one coat of Acrylic primer and follow with finish coats.

2. Repair of cracks or openings from 1/32” up to 1/16” wide:
   Bridge over voids and small cracks with elastomeric sealant. Feather product to zero at edges using brush, knife, or trowel, to prevent the repaired area from telegraphing through subsequent finishes. Do not apply more than ¼” in depth in one application. Spot prime with Acrylic primer. Follow with finish coats.

3. Cracks or openings from 1/16” wide to 3/8” wide:
   Route out surface material from crack or opening to remove loose unsound material. Flush out the opening to remove all dust. Fill crack or opening with elastomeric patching sealant; provide small crest over the opening to allow for shrinkage. Feather product to zero at edges using brush, knife, or trowel, to prevent the repaired area from telegraphing through subsequent finishes. Do not apply more than ¼” in depth in one application. Spot prime with Acrylic primer. Follow with finish coats.

C. Repair of stucco cracks or openings at exterior horizontal surfaces and parapet caps:

1. Remove any failed patching materials and to underlying stucco substrate.
2. Remove existing paint film on stucco substrate methods by scraping or sanding.
3. Repair existing cracks in stucco substrate as described in article 3.3B for wall surfaces.
4. Install acrylic and Portland cement patching compound with stainless steel trowel to prepared surface to uniform thickness per manufactures recommendations.
5. Embed fiberglass mesh immediately in the wet base coat. Smooth surface of base coat with trowel until the reinforcing mesh is fully embedded.
6. Apply Portland cement mortar/aggregate texture coat over patching material using coarse wet brush by throwing (splattering) mixture over patched areas to approximate original surface texture.
7. Allow base coat to cure according to manufacturers recommended duration.
8. Prime substrate with compatible primer as required for finish system indicated.

2.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

2.5 EXTERIOR COATING OF EXTERIOR STUCCO

A. Acrylic Coating:
   1. See Section 09 2423 Portland Cement Stucco for finish coating.

END OF SECTION
SECTION 09 30 00 – TILING

A. PART 1 - GENERAL

1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

2. SECTION INCLUDES
   a) Wall surfacing, installed using the thinset method, with cementitious grouted joints.
   b) Tile at in showers, set with thinset method (over ‘green-board’ in showers).

3. QUALITY ASSURANCE
   a) Conform to ANSI - Recommended Standard Specifications for Tile - A137.1.
   b) Conform to TCA Ceramic Tile: The Installation Handbook.
   c) Single source for setting products: Provide mortar, grout, waterproofing, and anti-fracture membrane from a single source/manufacturer unless otherwise approved by Owner's Representative.

4. SUBMITTALS
   a) Submit the following under provisions of Section 01 25 00 - Submittals.
   b) Submit representative color samples of each type tile and grout proposed for use.
   c) LEED submittal.

5. EXTRA STOCK
   a) At completion of project, deliver to Owner’s Representative extra stock of materials used on project as follows
      (1) Two cartons of each color of wall tile.
      (2) Two cartons of each back splash tile.
   b) Store in location as directed by Owner's Representative.

6. ENVIRONMENTAL REQUIREMENTS
   a) Do not install adhesives in a closed, unventilated environment.
   b) Maintain 50 degrees F during installation of mortar materials.

B. PART 2 - PRODUCTS

1. ACCEPTABLE TILE MANUFACTURERS
   a) Dahl Tile “Parkway” series, Size: 13 x 13”, color to be determined.
   b) Substitutions: Under provisions of Section 01 25 00 - Product Options and Substitutions.

2. TILE MATERIALS
   a) Wall Tile:
      (1) Size: Refer to Drawings.
      (2) Color: As selected by Owner's Representative.
   b) Trimmers
      (1) Provide necessary caps, stops, returns, trimmers and other shapes to complete installation.
      (2) Color and finish to match adjacent tile.
   c) Floor Tile

3. ACCEPTABLE MORTAR, GROUT, AND ADHESIVE MANUFACTURERS
   a) Laticrete.
   b) P.C.I. - U.S.A.
   c) Mapei
   e) Substitutions: Under provisions of Section 01 25 00 - Product Options and Substitutions.

4. MORTAR MATERIALS - THIN SET BEDS
   a) Mortar Bed: ANSI A118.4 thinset bond coat, dry-set cementitious mortar.

5. GROUT TYPE
   a) Grout:
      (1) Grade: ANSI A118.6, cementitious dry cure type, sanded for floors and un-sanded for walls.
      (2) Additives: Latex for strength and acid resistance.
      (3) Color: As selected by Owner's Representative.

6. MORTAR MIX AND GROUT
   a) Mix and proportion pre-mix setting bed mortar, adhesives, and grout materials in accordance with manufacturer's instruction.

C. PART 3 - EXECUTION

1. EXAMINATION
   a) Verify that areas to receive tile installed by thin bed method have wood float finish, are true within 1/4" in 10'-0", and are pitched to drains where required.
   b) Surfaces to Receive Tile: All floors to receive tile to have ¼“ cementitious backer board grouted and screwed to floors. All walls to receive tile to have ½“ cementitious backer board screwed to walls. Seams to be taped. Installation to be per manufacturer’s recommendations. See drawing details.
   c) Condition of Surfaces to Receive Tile
      (1) Surface to be firm, dry, clean and free of oily or waxy films, mortar and soil.
      (2) Grounds, anchors, plugs, hangers, bucks, electrical and mechanical work in or behind tile shall be
installed prior to proceeding with tile work.

(3) Wet down or wash dry, dusty [masonry] [concrete] surfaces and remove excess water immediately prior to application of tiles.

d) Beginning of work constitutes acceptance of substrate surfaces.

2. INSTALLATION

a) Tile Installation, General

(1) Install tile in accordance with ANSI/TCA A108.5, TCA Installation Specifications for substrate encountered, and in compliance with instructions of manufacturer of setting and grouting materials.

(2) Cut and fit tile tight to protrusions and vertical interruptions. Form corners and bases neatly.

(3) Work tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joint watertight, without voids, cracks, excess mortar, or grout.

(4) Prepare surface, fit, set, bond, grout and clean in accordance with applicable requirements of ANSI standards and Tile Council of America

(a) Walls

(i) Thinset on ‘green’ gypsum board

b) Layout

(1) Lay out work so that full tile or joint is centered on each wall and no tile of less than half width need be used. Do not interrupt pattern through openings.

(2) For heights stated in feet and inches, use courses of full tile to produce nearest attainable heights without cutting tile.

(3) No staggered joints will be permitted.

(4) Joints in tile shall align both directions.

(5) Align joints between floor and base tile.

(6) Make joints between sheets of tile exactly same width as joints within sheet.

(7) File edges of cut tile smooth and even.

(8) Verify layout with Owner’s representative prior to starting tile work.

c) Thin Set Method

(1) Apply mortar or adhesive with notched trowel using scraping motion to work material into good contact with surface to be covered. Maintain 90% coverage on back of tile and fully bed all corners.

(2) Apply only as much mortar or adhesive as can be covered within allowable windows as recommended by mortar or adhesive manufacturer or while surface is still tacky.

(3) When installing large tiles, ceramics or mosaics, trowel small quantity of mortar or adhesive onto back of each tile or sheet of tiles.

(4) Set tiles in place and rub or beat with small beating block.

(5) Beat or rap tile to ensure proper bond and also to level surface of tile.

(6) Align tile to show uniform joints and allow to set until firm.

(7) Clean excess mortar or adhesive from surface of tile with wet cheese cloth (not a sponge) while mortar is fresh.

(8) Sound tile after setting. Replace hollow sounding tiles.

d) Grouting

(1) Allow tiles to set a time as recommended by mortar manufacturer before grouting.

(2) Install in accordance with grout manufacturer's recommendations and ANSI A108.10.

(3) Pack joints full and free before mortar takes initial set.

(4) Clean excess mortar from surface with wet cheesecloth as work progresses. Do not use hydrosponges.

3. CLEANING

a) Clean excess grout from surface with water as work progresses. Perform cleaning while grout is fresh and before it hardens on surfaces.

b) Sponge and wash tile diagonally across joints. Polish with clean dry cloth.

c) Remove grout haze following recommendation of mortar additive manufacturer. Do not use acids for cleaning.

4. PROTECTION

a) Prohibit traffic from floor finish for 72 hours after installation.

b) Protect tile floors with heavy-duty, non-staining construction paper until Owner occupancy.

END OF SECTION 09 30 00 – Tiling
PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes vinyl plank floor coverings, without backings.
   1. Provide self leveling compound to fill, patch and smooth floors as needed.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples for Initial Selection: In manufacturer's standard size, but not less than 6-by-9-inch sections
   of each different color and pattern of floor covering required.

C. Qualification Data: For Installer.

1.3 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or
   more than 85 deg F, 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 postinstallation period, maintain temperatures within range recommended by manufacturer, but
   not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install floor coverings after other finishing operations, including painting, have been completed.

1.4 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. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in
      full roll width for each color, pattern, and type of floor covering installed.

PART 2 - PRODUCTS

2.1 VINYL PLANK FLOORING

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the
   Work include, but are not limited to, the following.
   1. Shaw Flooring; Native Origins 0116V Light Commercial Luxury Vinyl Plank
      a. Size: 6-inch by 48 inch plank
      b. Thickness: 12 mil (0.3mm), minimum
      c. Class III
SFCHA Santa Fe Community Living

d. Color: As selected by Architect from manufacturer's full range of standard colors and textures.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit sheet vinyl floor covering and substrate conditions indicated.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of floor coverings, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of floor coverings.

1. Provide self-leveling compound compatible with flooring manufacturer and floor adhesive as needed to fill and level floors.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
3. Moisture Testing:
   a. Perform anhydrous calcium chloride test, ASTM F 1867. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours.
   b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install floor coverings until they are same temperature as space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

   After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
A. Unroll sheet vinyl floor coverings and allow them to stabilize before cutting and fitting.

B. Lay out sheet vinyl floor coverings as follows:
   1. Maintain uniformity of floor covering direction.
   2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
   3. Match edges of floor coverings for color shading at seams.
   4. Avoid cross seams.

C. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.

D. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.

E. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.

F. Install floor coverings on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern with pieces of floor coverings installed on covers. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

G. Adhere floor coverings to 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 of adhesive spreader marks, and other surface imperfections.

H. Perform the following operations immediately after completing floor covering installation:
   1. Remove adhesive and other blemishes from floor covering surfaces.
   2. Sweep and vacuum floor coverings thoroughly.
   3. Damp-mop floor coverings to remove marks and soil.
      a. Do not wash floor coverings until after time period recommended by manufacturer.

I. Protect floor coverings 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.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Unfaced glass-fiber blanket insulation for use in acoustically treated walls.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated demonstrating compliance with product requirements.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to 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.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
   1. Guardian Building Products
   2. CertainTeed Corporation
   3. Knauf Insulation
   4. Owens Corning

A. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
   1. Use thickness as needed to fill the full width of stud cavity at demising walls.

B. Sustainability Requirements: Provide glass-fiber blanket insulation that are Greenguard Indoor Air Quality certified.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation 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. Provide sizes to fit applications indicated and selected from manufacturer’s standard thicknesses, widths, and lengths.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Install blankets in cavities formed by framing members according to ASTM C 1320 and manufacturer’s written instructions.

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

C. Bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.4 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.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes surface preparation and the application of paint systems on exterior substrates.
   1. Concrete masonry units (CMU).
   2. Steel.
   4. Wood
   5. Fiber cement siding and exterior trim.
B. Related Requirements:
   1. Section 099123 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 DEFINITIONS
A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM 523.
F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples for Initial Selection: For each type of topcoat product.
   1. Submit Samples on rigid backing, 8 inches (200 mm) square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.
C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches (200 mm) square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.
D. Product List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   3. VOC content.
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1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
      b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. BenjaminMoore&Co.
2. Dunn-EdwardsCorporation.
3. FrazeePaint.
4. ICIPaints.
5. KwalPaint.

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B. Products: Subject to compliance with requirements, provide one of the available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List." 

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors: As selected by Architect from manufacturer's full range.

2.3 PRIMERS/SEALERS

A. Primer, Bonding, Water Based: MPI #17.

2.4 METAL PRIMERS

A. Primer, Galvanized, Water Based: MPI #134.

2.5 WOOD PRIMERS

A. Primer, Latex for Exterior Wood: MPI #6.

2.6 WATER-BASED PAINTS

A. Latex, Exterior Semi-Gloss (Gloss Level 5): MPI #11.

2.7 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
3. Wood: 15 percent.
5. Gypsum Board: 12 percent.
6. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

F. Wood Substrates:
   1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
   2. Sand surfaces that will be exposed to view, and dust off.
   3. Prime edges, ends, faces, undersides, and backsides of wood.
   4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed to view:

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a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Contractor shall touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Galvanized-Metal Substrates:
   1. Latex System:
      a. Prime Coat: Primer, galvanized, water based, MPI #134.
      c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

B. Wood and Fiber Cement Substrates: Including Fiber Cement siding and trim.
   1. Latex System:
      c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5), MPI #11.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1. Section 06 2023 “Interior Finish Carpentry” for wood trim.
2. Section 09 2900 “Gypsum Board” for interior gypsum board finishes.
3. Section 09 9113 “Exterior Painting” for surface preparation and the application of paint systems on exterior substrates.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Color Verification: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current “MPI Approved Products List” for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than [1 gal. (3.8 L)] of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
   a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
   b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Benjamin Moore & Co.
2. Dunn-Edwards Corporation.

B. **Products:** Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 **PAINT, GENERAL**

A. **MPI Standards:** Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. **Material Compatibility:**

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. **VOC Content:** Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

D. **Low-Emitting Materials:** Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. **Colors:** As selected by Architect from manufacturer's full range.

1. Walls and Casing to be Sherwin Williams SW-7005 Pure White.

2.3 **PRIMERS/SEALERS**

A. Primer Sealer, Latex, Interior: MPI #50.

2.4 **WATER-BASED PAINTS**

A. Latex, Interior, Flat, (Gloss Level 1): MPI #53.

2.5 **SOURCE QUALITY CONTROL**

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

F. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

G. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
   1. SSPC-SP 2, "Hand Tool Cleaning."
   2. SSPC-SP 3, "Power Tool Cleaning."
   3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
   4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation. 

J. Wood Substrates:
   1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
   2. Sand surfaces that will be exposed to view, and dust off.
   3. Prime edges, ends, faces, undersides, and backsides of wood.
   4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed in equipment rooms:
      a. Equipment, including panelboards and switch gear.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Tanks that do not have factory-applied final finishes.
      h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

   2. Paint the following work where exposed in occupied spaces:
      a. Equipment, including panelboards.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
      h. Other items as directed by Architect.

   3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

   A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

      1. Contractor shall touch up and restore painted surfaces damaged by testing.
      2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

   A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

   B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

   C. Protect work of other trades against damage from paint application. Correct damage to work of
other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Wood Substrates: Including wood trim doors wood-based panel products glued-laminated construction exposed joists exposed beams Insert description.

1. Latex System:
   a. Prime Coat: Primer, latex, for interior wood, MPI #39.
   c. Topcoat: Latex, interior, flat, (Gloss Level 1), MPI #53.
   d. Topcoat: Latex, interior, (Gloss Level 2), MPI #44.
   e. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.
   f. Topcoat: Latex, interior, (Gloss Level 4), MPI #43.
   g. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.
   h. Topcoat: Latex, interior, gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees), MPI #114.

B. Gypsum Board Substrates:

1. Latex System:
   a. Prime Coat: Primer sealer, latex, interior, MPI #50.
   b. Prime Coat: Latex, interior, matching topcoat.
   d. Topcoat: Latex, interior, flat, (Gloss Level 1), MPI #53.
   e. Topcoat: Latex, interior, (Gloss Level 2), MPI #44.
   f. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.
   g. Topcoat: Latex, interior, (Gloss Level 4), MPI #43.
   h. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.
   i. Topcoat: Latex, interior, gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees), MPI #114.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Dwelling unit bathroom accessories.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify products using designations indicated.
C. Maintenance data.
D. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE
A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4 WARRANTY
A. Special Mirror Warranty: Manufacturer’s standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DWELLING UNIT BATHROOM ACCESSORIES
A. Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following Basis-of-Design.
B. Toilet Tissue Dispenser:
   1. Basis-of-Design Product: Franklin Brass, #5508BSF
   2. Description: Single-roll dispenser.
C. Shower Curtain Rod:
   2. Outside Diameter: 1-inch
   5. Accessories: Integral chrome-plated brass glide hooks.
D. Medicine Cabinet:
   1. Basis-of-Design Product: Franklin Brass, #1340
2. Mounting: Recessed, for nominal 4-inch wall depth.
3. Size: 14W x 23-3/4H, x 3D inch, 22 ga. baked enamel steel,
4. Door: Framed mirror door concealing storage cabinet equipped with continuous hinge and spring-buffered, rod-type stop and magnetic door catch.
5. Shelves: Three, adjustable.

E. Towel Ring:
1. Basis-of-Design Product: Franklin Brass, #5516SF
2. Mounting: Surface Mounted with concealed fasteners

F. Towel Bar:
1. Basis-of-Design Product: Franklin Brass, #5524SF
2. Mounting: Surface Mounted with concealed fasteners
3. Size: 24-inches

2.2 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Operation and maintenance data.
C. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE
A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
C. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.4 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS
A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet indicated.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Larsen's Manufacturing Company.
      b. Amerex Fire Extinguishers.
B. Dwellings: MP-5 (Multipurpose Dry-Chemical), Rating 2A-10B:C.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Examine fire extinguishers for proper charging and tagging.
1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: Beneath kitchen sinks in dwelling units.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION
SFCHA Santa Fe Community Living
SECTION 11 31 00 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the following:
   1. Cooking equipment.
   2. Ventilation range hoods.
   3. Refrigerator/freezers.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated. For appliances, documentation indicating that products are ENERGY STAR rated.
B. Appliance Schedule: Use same designations indicated on Drawings.
C. Warranty and Maintenance data.

1.3 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE
A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Residential Appliances: Comply with NAЕCA standards.
D. Energy Ratings: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

1.5 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
   1. Electric Range: Five-year limited warranty for in-home service on surface-burner elements.
   2. Refrigerator/Freezer: Five-year limited warranty for in-home service on the sealed refrigeration system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:
   1. KitchenAid, a division of Whirlpool Corporation.
   2. Sears Brands LLC (Kenmore).
   3. GE Appliances.

2.2 COOKING APPLIANCES
A.  Free-standing Electric Range:
1.  Basis-of-Design Product: Kenmore 22-91062, 30"
2.  Type: Four burner, standard coil with porcelain top
3.  Oven racks: 2 racks, 4.9 cu. ft. capacity
4.  Controls: Rear mounted (front mounted at ADA locations only)
5.  Finish: Manufacturer's standard white.

B.  Exhaust Hood: RH
1.  Basis-of-Design Product: Kenmore 22-5164X, 30"
2.  Type: 30-inch undercabinet range hood.
4.  Finish: Manufacturer's standard white.
5.  Provide lamps when sold separately
6.  Wall switch to operate exhaust fan is required at ADA units

2.3  REFRIGERATION APPLIANCES
A.  Dwelling Unit Refrigerator/Freezer:
1.  Basis-of-Design Product: Kenmore 46-70232
2.  Type: Freestanding, with freezer on top.
3.  Energy Star Rated
4.  Storage Capacity: 20.9 cu. ft. total
5.  Finish: Manufacturer's standard white.

2.4  GENERAL FINISH REQUIREMENTS
A.  Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
B.  Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1  INSTALLATION, GENERAL
A.  General: Comply with manufacturer's written instructions.
B.  Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
C.  Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
D.  Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements.

3.2  FIELD QUALITY CONTROL
A.  Perform tests and inspections.
  1.  Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
  2.  Operational Test: After installation, start units to confirm proper operation.
  3.  Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
B.  An appliance will be considered defective if it does not pass tests and inspections.
SECTION 12 21 13 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Horizontal louver blinds with polymer slats.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples: For each exposed finish.

C. Maintenance data.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide horizontal louver blinds with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.


B. Product Standard: Provide horizontal louver blinds complying with WCSC A 100.1.

PART 2 - PRODUCTS

2.1 HORIZONTAL LOUVER BLINDS, POLYMER SLATS

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. Products: Subject to compliance with requirements, provide one of the following:

1. Comfortex Window Fashions;
2. Hunter Douglas;
3. Levolor, a Newell Rubbermaid Company;
4. Mark Window Products;
5. Springs Window Fashions Division, Inc.;

C. Slats: Lead-free, UV-stabilized, integrally colored, opaque, permanently flexible, extruded PVC that will not crack or yellow; antistatic, dust-repellent treated; with crowned profile.

1. Width: 1 inches.
   a. Spacing: Manufacturer's standard.

2. Finish: As selected by Architect from Manufacturer's full range of standard options.

D. Headrail: Formed steel or extruded aluminum; long edges returned or rolled; fully enclosing operating mechanisms on three sides and ends.

E. Bottom Rail: Manufacturers standard.
F. Ladders: Braided string Evenly spaced to prevent long-term slat sag.

G. Tilt Control: Enclosed worm-gear mechanism and linkage rod.


I. Valance: Manufacturer's standard.

J. Mounting: End mounted in window recess.

K. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard, as indicated.

L. Colors, Textures, Patterns, and Gloss: As selected by Architect from manufacturer's full range.

2.2 HORIZONTAL LOUVER BLIND FABRICATION

A. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.


B. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows:

1. Blind Units Installed between (inside) Jambs: Width equal to 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch, less than jamb-to-jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch, plus or minus 1/8 inch, less than head-to-sill dimension of opening in which each blind is installed.

2. Blind Units Installed outside Jambs: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail, valance, and operating hardware, and for hardware position and blind mounting method indicated.

D. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

E. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish.

F. Component Color: Provide rails, cords, ladders, and exposed-to-view metal and plastic matching or coordinating with slat color, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.
3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb and aligned with adjacent units according to manufacturer's written instructions, and located so exterior slat edges in any position are not closer than 1 inch to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances between adjacent blinds and for operating glazed opening's operation hardware if any.

B. Recessed: Install headrail concealed within blind pocket.

C. Adjust horizontal louver blinds to operate smoothly, easily, safely, and free of binding or malfunction throughout entire operational range.

D. Clean horizontal louver blind surfaces after installation, according to manufacturer's written instructions.

E. Windows larger than 4' will be comprised of two blinds.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

2. Vanity cabinets.
3. Plastic-Laminate Countertops

1.2 SUBMITTALS

A. Product Data: For cabinets, and cabinet hardware.

B. Shop Drawings: For cabinets. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, methods of joining countertops, and cutouts for plumbing fixtures.

C. Samples: For each type of material exposed to view.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Quality Standards: Unless otherwise indicated, comply with the following standards:

   a. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semi exposed location.

PART 2 - PRODUCTS

2.1 CABINET MATERIALS

A. General:

1. Adhesives: Do not use adhesives that contain urea formaldehyde.
2. Hardwood Lumber: Kiln dried to 7 percent moisture content.
3. Softwood Lumber: Kiln dried to 10 percent moisture content.
5. Particleboard: ANSI A208.1, Grade M-2, made without urea formaldehyde.

B. Exposed Materials:

1. Exposed Wood Species: Maple.
   a. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
   b. Staining and Finish: As selected by Architect from manufacturer's full range.

2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
3. Plywood: Hardwood plywood with face veneer of species indicated, with Grade A faces and Grade C backs of same species as faces.
4. Plastic Laminate: Particleboard faced with high-pressure decorative laminate complying with NEMA LD 3, Grade VGS.
   a. Colors, Textures, and Patterns: As selected by Architect from cabinet manufacturer's
SFCHA Santa Fe Community Living

full range.

5. PVC Edge Molding: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, and 1 mm thick elsewhere.

C. Semi exposed Materials: Unless otherwise indicated, provide the following:
   1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects. Same species as exposed surfaces.

D. Concealed Materials: Solid wood or plywood, of any hardwood or softwood species, with no defects affecting strength or utility; particleboard; medium-density fiberboard; or hardboard.

2.2 CABINET HARDWARE

A. General: Manufacturer's standard units complying with BHMA A156.9, of type, size, style, material, and finish as selected by Architect from manufacturer's full range.

B. Pulls: Back-mounted decorative pulls as selected by Architect from manufacturer's full range of standard options.

C. Hinges: Concealed European-style self-closing hinges.
   1. Basis of Design: Blum 1 ½” Overlay P/N 39 3580

D. Drawer Guides: Epoxy-coated-metal, self-closing drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05011 or B05091.
   1. Full extension drawer guide with soft-close concealed under-mount with 100lb rating.

2.3 CABINETS

A. Available Manufacturers: Subject to compliance with requirements, available manufacturers include but are not limited to the following:
   1. Lanz Cabinets
   2. Merillat Cabinets
   3. Republic Industries

C. Face Style: Face overlay.

D. Cabinet Style: Face Frame.

E. Door and Drawer Fronts: Wood Veneer, 3/4 inch (19 mm) thick
   1. Door style: Basis-of-Design: LAnz Northview Collection, Manitoba natural maple

F. Face Frames: 3/4-by-1-5/8-inch solid wood.

G. Exposed Cabinet End Finish: Wood veneer.

2.4 PLASTIC-LAMINATE COUNTERTOPS

A. Grade: Custom.

B. High-Pressure Decorative Laminate Grade: HGS, NEMA LD3
   1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
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2. Adhesive for Bonding Plastic Laminate: Contact cement white or yellow wood glue and is good for use with through-color laminates.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:
      a. Solid colors.
      b. Patterns.

D. Grain Direction: Parallel to cabinet fronts.

E. Edge Treatment: Same as laminate cladding on horizontal surfaces.

F. Core Material: ¾ inch Industrial grade medium density particleboard.

G. Core Material at Sinks: ¾” particleboard made with exterior glue.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.

B. Install cabinets without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.

C. Install casework level and plumb to a tolerance of 1/8 inch in 8 feet.

D. Fasten cabinets to adjacent units and to backing.
   1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
   2. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c., with toggle bolts through metal backing behind gypsum board.

E. Fasten plastic-laminate countertops by screwing through corner blocks of base units into underside of countertop. Form seams using splines to align adjacent surfaces, and secure with glue and concealed clamping devices designed for this purpose.

F. Fasten solid-surfacing-material countertops by screwing through corner blocks of base units into underside of countertop. Align adjacent surfaces, and form seams to comply with manufacturer's written instructions using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

G. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. Related sections: Refer to “Section 23 00 00, HVAC General Mechanical Requirements” for basic requirements of all work.

PART 2 PRODUCTS

2.01 PIPING GENERAL

A. Steel: ASTM A-120, Schedule 40

B. Copper: ASTM B-88

C. Cast Iron: CISPI HS-67 or CISPI 301-67-T

D. PVC DWV: ASTM D 2321 (Sewer and Gravity flow) and ASTM D 2665

E. PVC Pressure Pipe: ASTM D 2441

F. PEX: ASTM F876 and ASTM F 877

2.02 FITTINGS

A. Malleable Iron: ANSI B 16.3

B. Cast Iron: ANSI B16.4

C. Wrought Copper: ANSI B 16.8 or ANSI B 16.22

D. Weld Fittings: ANSI C 16.9

E. PVC DWV: ASTM 1866 or ASTM 2665

F. PVC Pressure Pipe: ASTM 2466 or ASTM 2467

G. PEX: ASTM 1807 or ASTM 1960

2.03 JOINTS

A. For Cast Iron Pipe: ASTM C-564 double seal elastomeric compression-type gaskets, or CUSP 301, 67T, no-hub joint.

2.04 UNIONS


C. Dielectric Unions: Provide dielectric unions with appropriate end connections for the pipe materials in which installed (screwed or Soldiered), which effectively isolate dissimilar metals, prevent galvanic action, and stop corrosion.

D. Dielectric Waterway Fittings: Electroplated steel or brass nipple, with an insert and non-corrosive, thermoplastic lining.

2.05 PIPE THREADS

A. ASA B2.1

2.06 HANGERS
A. Federal Specifications WW-H-171. Fee and Mason, Grinnell Company, or approved equal. Sectional expansion hangers with turnbuckle and beam clamps, ceiling or insert plates, or lag screws, as required.

2.07 SHEETS
A. Galvanized Steel: ASTM A-525
B. Lead: Federal Specifications QQ-1-206, Grade B

2.08 VALVES
A. See individual sections.

2.09 FLOOR, WALL AND CEILING PLATES
A. Shall be chrome plated pressed or stamped brass, either one piece or split pattern held in place by internal spring tension or set screw.

2.10 MISCELLANEOUS PIPING MATERIALS/PRODUCTS
A. Welding Materials: Except as otherwise indicated, provide welding materials as determined by Installer to comply with installation requirements.
   2. Brazing Materials: Except as otherwise indicated, provide brazing materials as determined by Installer to comply with installation requirements.
   2. Comply with SFA-5.8, Section II, ASME Boiler and Pressure Vessel Code for brazing filler metal materials.
B. Soldiering Materials: Except as otherwise indicated, provide Silver Brite 100 solder.

2.11 INSULATION
A. Pipe and equipment insulation shall conform to Underwriters Laboratories 40, U.15.19 “Pipe and Equipment Cover Systems”. Ductwork insulation lining and adhesives shall conform to NFPA 90A, and shall be U/L Class 1.

2.12 SLEEVES
A. Steel Sleeves: Schedule 40 galvanized, welded steel pipe shall be utilized for pipe passing through masonry or concrete construction.
B. Sheet metal Sleeves: 10 gauge, galvanized sheet metal shall be utilized for ducts passing through masonry or concrete construction for pipes and ducts passing through finished partitions of ceilings.

2.13 PIPING SPECIFICATIONS
A. Sanitary and Waste Lines:
   1. All lines underground shall be either PVC DWV or standard cast iron compression type gaskets. Lines above ground shall be either PVC DWV or standard weight compression joint or no-hub joint.
B. Sanitary Vent Piping:
   1. Sanitary vent piping shall be PVC DWV or service weight no-hub cast iron.
C. Water Piping in the Building:
   1. Non-oxygen barrier PEX tubing or Type L hard drawn copper water tubing for above grade installation. Piping in the ground shall be copper type K tubing with no below slab joints.
D. Gas Piping:
   1. Gas piping shall be schedule 40, screwed black steel. Underground piping and exterior exposed piping shall have a protective coating. Protective covering on the underground pipe shall be mechanically applied in a factory of field plant especially equipped for the purpose, except as hereinafter indicated. Specials and fittings which cannot be coated mechanically shall have the protective covering applied by hand. Hand applied covering shall equal in
coating thickness and effectiveness to that of mechanically applied covering. The pipe covering material shall be Scothkote No. 101 pipe coating resin, as Manufactured by the Minnesota Mining and Manufacturing CO., or X-Tru Coat as manufactured by Standard Pipe Protection, Inc.

2.14 VALVES

A. General:
1. Furnish and install valves at the inlet and outlet of each piece of equipment, ahead of all control valves and at all places shown on the drawings. All shut off type valves shall be ball valves unless otherwise indicated.
2. All ball valves shall be full port, line size equal to Conbraco Apollo 77-200 Series.

B. Domestic Water Lines
1. Valves shall be equal to

<table>
<thead>
<tr>
<th>Type</th>
<th>3&quot; and Smaller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball valve</td>
<td>Conbraco</td>
</tr>
<tr>
<td>Check valve</td>
<td>Crane #1303</td>
</tr>
<tr>
<td>Plug cocks</td>
<td>DeZurik #427</td>
</tr>
</tbody>
</table>

C. Gas Service:
1. Valves shall be similar and equal to DeZurik conforming to specification D-ASA B-31.8 for gas transmission and distribution piping.

2.15 V-TYPE STRAINERS

A. Provide strainers full size of connecting piping, with body and ends to match piping system materials. Screen shall be Type 304 stainless steel, with 3/64" perforations at 233 per square inch.

2.16 AIR CHAMBERS

A. Air chambers shall be 18" long and the same diameter and material as the supply, with caps and shall be provided on all hot and cold branches of every plumbing fixture. All air chambers shall be concealed in the partitions. Where piping is exposed, air chambers shall be close to faucet or open-closing device. Shock absorbers are an acceptable alternate.

2.17 EXPANSION AND CONTRACTION

A. Provide for expansion and contraction of all piping, using expansion joints, swing joints, ball joints, bends, or other approved methods. Furnish anchors, when necessary, to prevent movement of pipe. All anchors shall be separate and independent of all hangers and supports, and shall be designed of heavy fabricated steel to prevent movement of pipe under the stresses encountered. Shop drawings shall be submitted showing location of all anchors, expansion joints, ball joints, etc.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

A. Except for hub-and spigot, and similar units of pipe, provide factory applied plastic end caps on each length of pipe and tube. Maintain end-caps through shipping storage and handling as required to prevent pipe-end damage and to eliminate dirt and moisture of pipe or tube.

B. Where possible, store pipe and tube inside, protected from the weather. Where it is necessary to store outside, elevate above grade and enclose with durable, waterproof wrapping.

C. Protect fittings from moisture and dirt by inside storage and enclosure, or by covering with durable, waterproof wrapping.

3.02 INSTALLATION

A. The installation shall be in conformity with best practice and shall contribute to the efficiency of the operation, accessibility, sightlessness, and efficient maintenance. Installation shall conform to codes and standard of the National Engineering Societies applicable, to the manufacturer’s recommendations, and shall also conform to the building structure, structure, equipment and usage. No part of the installation shall interfere with the operation of any other systems or operational part of the building. The drawings show the general design, arrangement, and extent of the system, and shall not be scaled for rough-in-measurements or used as shop drawings.
3.03 PIPING

A. Provisions for Drainage: All piping systems shall be installed so that they may be easily drained. Drain caps, plugs, of drains, shall be installed at low points.

B. Alignment: All installed pipes shall be straight and have no strains. Proper allowance shall be made for expansion and contraction.

C. Clean as installed: All piping must be clean and free from scale or loose dirt when installed and must be kept clean during the completion of the installation. All openings in the piping system shall be capped or plugged while awaiting further connections.

D. Welding Black steel pipe one inch and larger shall be welded according to the American Standard Code for Pressure Piping, ASA B-31.1, using standard welding fittings. No notching or mitering of pipe will be accepted. Welding shall be done by certified welders meeting the qualification of the Heating, Piping, and Air Conditioning Contractor’s National Association.

E. Soldering and Brazing: Soldering and brazing shall conform to ANSI - B .1 Standard safety code for Mechanical Refrigeration.

F. Bending: No bending of piping will be permitted.

G. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical equipment spaces and enclosures.

3.04 PIPING SYSTEM JOINTS

A. Thread pipes in accordance with ANSI B 2.1; cut threads full and clean using sharp dies. Ream threads ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/joint manufacturer, on male threads at each joint and tighten joint to leave not more than three threads exposed.

B. Braze copper tube-and fitting joints where indicated, in accordance with ASME B 31.

C. Solder copper tube-and fitting joints where indicated, in accordance with industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder to flux to joint areas of both tube and fitting. Insert tube full depth into fitting and solder in a manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

D. Mechanically Formed Tee Connections: In lieu of providing tee fittings in the copper tubing. Installer may, as an option, provide mechanically formed tees, providing they are in accordance with the following:
   1. Size and wall thickness of both run tube and branch tube are listed by the Manufacturer of forming equipment as “Acceptable Application”.
   2. Height of drawn collar is not less than three times wall thickness of run tubing.
   3. End of branch tube is notched to conform to inner curve of run tube, and dimpled to set exact penetration depth into collar.
   4. Resulting joint is minimum of three times as long as thickness of thinner joint member, and brazed using B-CUP series filler metal.

E. Mechanically Formed Couplings: In lieu of providing couplings in copper tubing, Installer may, as an option, provide mechanically formed couplings, provided they are in accordance with the following:
   1. Form couplings by first annealing area at the end of the tube where expansion will occur. Insert the tube expander to die size and expand the tube end to accept tubing of the same size.
   2. Resulting joint must be a minimum of three times as long as the thickness of the tube, and brazed using B- CUP series filler metal.

F. Weld pipe joints in accordance with recognized industry practice and as follows:
   1. Weld pipe joints only when ambient temperature is above 0 deg. F.
   2. Bevel pipe ends at a 37.5 deg. Angle, smooth rough cuts, and clean to remove slag, metal particles and dirt.
3. Use pipe clamps or tack-weld joints with 1" long welds; four welds for pipe sizes to 10", eight welds for pipe sizes 12" to 20".
4. Build up welds with stringer-bead pass, followed by hot pass, followed by cover or filler pass. Eliminate valleys at center and edges of each weld. Weld procedures which will insure elimination of unsound or unfused metal, creaks, oxidation, blow-holes, and non-metallic inclusions.
5. Do not weld piping system imperfections by tack-welding procedures, prefabricate to comply with requirements.
6. At Installer’s option, install forged branch-connection fittings where ever branch pipe is indicated; or install regular “T” fitting.

G. Hubless Cast-Iron Joints: Comply with coupling manufacturer’s directions.

3.05 DUCTWORK
A. All ductwork shall be rigidly supported by the building structure, using strap hangers. All ducts, diffusers, and grilles and connected equipment shall be clean when installed and kept clean until the system is completed. All ducts shall be properly flashed and counter flashed.

3.06 UNIONS
A. Install a union on the down stream side of all shut-off valves, at equipment connection, where needed for disassembling of piping and where shown on the plans.

3.07 HANGERS
A. Hangers for all piping shall support the pipe without piercing the insulation. Insulated shields shall distribute the load so that it will not crush, compress, or deform the insulation. Piping shall be anchored where required to localize expansion or to prevent undue strain on piping and branches. Vertical risers shall be supported at four feet on center. Hangers for steel pipe shall be spaced at 6'-0" o.c. for pipes 1" and smaller, 9'-0" o.c. for pipes 1 1/4" to 2"; 10'-0" o.c. for larger pipes. Copper tubing shall be supported at 6'-0" o.c. for piping 1 1/2" and smaller and 10'-0" o.c. for piping 2" and larger. Cast iron pipe shall be supported 4'-0" o.c. Use of plumber tape or chains will not be allowed.

3.08 ISOLATORS
A. All rotating equipment or apparatus shall be isolated form the structure by vibration isolation devices and from piping by flexible connection. Use Mason Industries Type NK pads, unless otherwise indicated on the drawings.

3.09 SUPPORTS
A. Support piping independently at pumps, tanks, etc., so that the weight will not be supported by the equipment.

3.10 FLOOR, WALL, AND CEILING PLATES
A. Provide throughout the building for all pipes in all furnished rooms.

3.11 INSULATION
A. Shall be continuous throughout walls, partitions, floors, and ceilings.

3.12 CLEANING, FLUSHING, AND INSPECTION
A. Clean exterior surfaces of installed piping system of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports, and accessory items.
B. Disinfect water mains and water service piping in accordance with Section 3.16, 22 11 00, and/or AWWA C601.

3.13 IDENTIFICATION TAGS AND LABELS
A. Pipe Labels: Pipe labels shall be self adhesive labels, all-temporary Permacode pipe markers no. B-
B. Tags: Tags shall be aluminum, brass or laminated plastic 2"x 1" minimum with edges ground smooth or rolled. Each tag shall be punched to receive a chain. Letters and numbers shall be evenly spaced and stamped or engraved into the surface.

C. Equipment Labels: Engraved plastic-laminate signs shall be melamine plastic laminate six inches long by three inches high by 1/8 inch thick. The lettering shall be block type with 1 - ½ inch height.
   1. Laminate core color shall be white.
   2. Laminate face colors shall be color treated as follows:
      a. Green: Cooling equipment and components
      b. Yellow: Heating equipment and components
      c. Blue: Equipment and components that do not meet any of the above criteria

D. Installation of piping: Bare pipes to be marked shall first be wiped clean of dirt, dust, grease, and moisture. Markers to be installed on painted piping shall be applied only after completion of the final coat of paint. Insulated piping shall be painted to a smooth, hard surface in the area the label is to be applied. Labels should be applied, using pressure, so that it lies smooth and flat. After application on insulated pipes, the labels shall be stapled securely to the insulation. A brush coat of clear lacquer shall be applied and the lettering positioned to be legible. For overhead piping, apply markers on the lower half of the pipe where view is unobstructed, so that markers can be read from floor level. The wording on the labels shall correspond directly to that on the Mechanical symbols list, regardless of manufacturer.
   1. Use an arrow marker with each pipe-content marker. The arrow shall point away from the pipe marker and in the direction of flow, with background color and height the same as the content marker. If flow can be in both directions, use two arrows.
   2. Apply pipe marker at each valve, at every point of entry or exit through wall or ceiling, on each riser and branch of tee, and every twenty feet on long continuous lines or at every bay or aisle to show proper identification of pipe content and direction of flow.

E. Installation of valves: Valve tags shall be attached to the valve handle with brass chain. All main service valves shall be tagged and identified as to the type of service. All ball valves, gate valves or stop cocks controlling branch mains or risers shall be tagged and identified as to the areas served.

F. Installation on Equipment: All major pieces of equipment shall be identified with an engraved plastic-laminated sign. Each piece of equipment requiring a sign shall be thoroughly cleaned prior to installing the label. Plastic-laminated signs shall be attached by self-taping stainless steel screws, except contact-type permanent adhesive or where screws cannot or should not penetrate the substrate.
PART 1  GENERAL

1.01  RELATED DOCUMENTS:

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

B. Related Sections: Refer to Sections 22 10 00 and 23 00 00 for requirements for all mechanical work.

1.02  SCOPE

A. Complete system including connection to the water supply outside of the building, service lines and
   connection to all plumbing fixtures and outlets. Contractor is responsible for layout, verification and
   installation of a complete and operating water system, from service connection to fixtures.

PART 2  PRODUCTS

See Section 22 10 00 “Plumbing Basic Materials and Methods” for Material Specifications.

2.01  GENERAL PRODUCTS

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

1. Basket Strainers:
   b. Metraflex Co.
   c. Sarco.

2. Balance Cocks:
   a. American Air Filter Co.
   b. Bell & Gossett ITT; Fluid Handling Div.
   c. Hammond Valve Corp.
   d. Milwaukee Valve Co., Inc.
   e. Spirax Sarco.
   f. Taco, Inc.

3. Bibbs and Faucets:
   a. Hammond Valve Corp.
   b. Lee Brothers; Div. Phelps Dodge Brass Co.
   c. Mansfield Plumbing Products.
   d. Nibco Inc.
   e. Prier Brass Mfg. Co.
   g. Woodford Mfg. Co.

4. Hydrants:
   c. Tyler Pipe; Sub. of Tyler Corp.
   d. Woodford Mfg. Co.
   e. Zurn Industries Inc., Hydromechanics Div.

5. Backflow Preventers:
   a. Febco Sales, Inc.; Subs. of Charles M. Bailey Co., Inc.
   b. Hersey Products, Inc.
   c. ITT Lawler; Fluid Handling Div.
   d. Watts Regulator Co.

6. Pressure Regulating Valves:
   b. Cla-Val Co.
   c. Spence Engineering Co., Inc.
   d. Watts Regulator Co.

7. Relief Valves:
   b. Conbraco Industries, Inc.
   c. Watts Regulator Co.
   d. Zurn Industries, Inc.; Wilkins-Regulator Div.

8. Water Hammer Arresters:
   a. Amtrol, Inc.
c. Tyler Pipe; Sub. of Tyler Corp.
d. Zurn Industries, Inc.; Hydromechanics Div.

9. Dielectric Waterway Fittings:
a. Victaulic Company of America

10. Dielectric Unions:
a. Perfection Corp.
b. Watts Regulator Co.

c. Armstrong Machine works.
d. Hoffman Specialty ITT; Fluid Handling Div.

11. Y-Pattern Strainers:
a. Armstrong Machine works.
b. Hoffman Specialty ITT; Fluid Handling Div.

c. Metraflex Co.
d. Spirax Sarco.
e. Trane Co.
f. Victaulic Co. of America. (low pressure applications only)
g. Watts Regular Co.

B. Pipe and Tube Materials:
1. General: Refer to Part 3, Article "Pipe Applications" for identification of systems where the below materials are used.
2. Drawn Temper Copper Tubing: ASTM B88, Type L.
3. Annealed Temper Copper Tubing: ASTM B88, Type K.
4. Crosslinked Polyethylene (PEX) Tubing: ASTM F 876 or F 877, non-oxygen barrier
5. PVC Pressure Rated Piping: ASTM D 2241

C. Fittings:
2. Cast Bronze Flanges: ANSI B16.24, Class 150; raised ground face, bolt holes spot faced.
4. Dielectric Unions: Threaded or soldered end connections as required to suit application; constructed to isolate dissimilar metals, prevent galvanic action, and prevent corrosion.

D. Joining Materials:

E. General Duty Valves:
1. Special duty valves are specified below by their generic name refer to part 3, Article "Valve Application" for specific uses and applications for each valve specified.

F. Piping Specialties:
1. Water Hammer Arresters: Bellows type with stainless steel casing and bellows, pressure rated for 250 psi, tested, certified, sized and located in accordance with PDI Standard WH-201.
2. Basket Strainers: Cast-iron body with 125 psi flanges, bolted type or yoke type cover; with removable non-corrosive perforated strainer basket having 1/8 inch perforations and lift-out handle.
5. Recessed Non-Freeze Wall Hydrants: Cast-bronze box with chrome plated face, tee handle key, vacuum breaker, hinged locking cover, 3/4 inch inlet, and hose outlet. Bronze casing length shall suit wall thickness.
6. Projecting Non-Freeze Wall Hydrants: Cast-bronze, with chrome plated face, tee handle key, vacuum breaker, 3/4 inch inlet, and those outlet. Bronze casing length shall suit wall thickness.
7. Floor Level Non-Freeze Hydrants: Cast-bronze hydrant with rough bronze box, tee handle key, drain hole, vacuum breaker, hinged locking cover, 3/4 inch inlet, and hose outlet. Bronze casing length shall suit wall thickness.
8. Non-Freeze Post Hydrants: Cast-bronze hydrant with level action control, drain hole, vacuum breaker, 3/4 inch inlet, and hose outlet. Bronze casing with cast-iron casing guard shall be length to suit depth ofbury.
9. Backflow Preventers: Reduced pressure principal assembly consisting of shutoff valves on inlet and outlet, and strainer on inlet. Assemblies shall include test cocks, and pressure-differential relief valve located between TWO (2) positive seating check valves, and comply with requirements of ASSE Standard 1013.
10. Pressure Regulating Valves: Single seated, direct operated type; having bronze body with integral strainer, and complying with requirements of ASSE Standard 1003. Select proper size for maximum flow rate and inlet and outlet pressures indicated.
11. Relief Valves: Provide proper size for relief valve, in accordance with ASME Boiler and Pressure Vessel Codes, for indicated capacity of the appliance for which installed.

2.02 PIPES
A. Domestic water distribution and piping including cold water, hot, water, and recirculating water lines shall be either PEX non-oxygen barrier tubing or type “L” hard drawn copper tubing with soldered wrought copper fittings. Solder shall be Silverbrite 100.
B. Below grade water distribution piping beneath the building shall be type “K” softdrawn copper tubing with no joints allowed.
C. Below grade water service line shall be type “K” hard drawn copper tubing with brazed wrought copper fittings.
D. Pipe exposed in finished rooms shall be chromium plated.

2.03 MISCELLANEOUS
A. All shut-off valves shall be full port valves unless otherwise indicated.
B. Escutcheons shall be chrome plated brass. Single piece or hinged two piece is acceptable.

PART 3 EXECUTION
3.01 GENERAL  See Section 22 10 00 for basic installation specifications.
A. Verify all dimensions by field measurements. Verify that all water distribution piping is installed in accordance with pertinent codes and regulations, the original design, and the referenced standards.
B. Examine rough-in requirements for plumbing fixtures and other equipment having water connections, to verify actual locations of piping connections prior to installation.
C. Do not proceed until unsatisfactory conditions have been corrected.

3.02 BRANCH LINES
A. Provide valves on cold and hot distribution lines on each branch line. At water closets, run branch line full size to last closet.

3.03 FIXTURE CONNECTIONS
A. Each hot and cold water connection to a fixture or faucet shall be equipped with a full size vertical air chamber not less than 18” long.

3.04 PIPE APPLICATIONS
A. Install PEX non-oxygen barrier tubing or type L, drawn copper tubing with wrought copper fittings and solder joints for 3 inch and smaller, above ground and within building. Install Type K, annealed temper copper tubing for 3 inch and smaller, with minimum number of joints, below ground and within slabs.

3.05 PIPING INSTALLATION
A. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the piping systems. Location and arrangement of piping layouts take into consideration pipe sizing and friction loss, expansion, pump sizing, and other design considerations. So far as practical, install piping as indicated. Use fittings for all changes in direction and all branch connections.
B. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted, unless expressly indicated.
C. Install piping free of sags or bends and with ample space between piping to permit proper insulation applications.
D. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.
E. Install piping tight to slabs, beams, joists, columns, walls, and other permanent elements of the building. Provide space to permit insulation applications, with 1 inch clearance outside the insulation. Allow sufficient space above removable ceiling panels to allow for panel removal.

F. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

G. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4 inch ball valve, and short 3/4 inch threaded nipple and cap.

H. Exterior Wall Penetrations: Seal pipe penetrations through exterior walls using sleeves and mechanical sleeve seals. Pipe sleeves smaller than 6 inch shall be steel; pipe sleeves 6 inch and larger shall be sheet metal.

I. Fire Barrier Penetrations: Where pipes pass though fire rated walls, partitions, ceilings, and floors, maintain the fire rated integrity.

J. Install piping level with no pitch. If a slope is required, install with 1/32 inch per foot (1/4 percent) downward slope toward drain point.

3.06 PIPE AND TUBE JOINT CONSTRUCTION

A. Soldered Joints: comply with the procedures contained in the AWS "Soldering Manual". Solder shall contain no lead.

B. Heat joints to proper and uniform temperature.

C. Threaded Joints: Conform to ANSI B1.20.1, tapered pipe threads for field cut threads. Join pipe fittings and valves as follows:
   1. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
   2. Align threads at point of assembly.

D. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).

E. Assemble joint wrench tight.

F. Flanged Joints: Align flange surfaces parallel. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.

3.07 SERVICE ENTRANCE

A. Extend water distribution piping to connect to water service piping, of size and in location indicated for service entrance to building. Water service piping is specified in a separate Section of Division 2.

B. Install sleeve and mechanical sleeve seal at penetrations through foundation wall for watertight installation.

C. Install shutoff valve at service entrance inside building; complete with strainer, pressure gage, and test tee with valve.

3.08 VALVE APPLICATIONS

A. General Duty Valve Applications: The Drawings indicate valve types to be used. Where specific valve types are not indicated the following requirements apply:

B. Shut-off duty: Use gate, ball, and butterfly valves.

3.09 INSTALLATION OF VALVES

A. Sectional Valves: Install sectional valves on each branch and riser, close to main, where branch or riser serves TWO (2) or more plumbing fixtures or equipment connections, and elsewhere as indicated. For sectional valves 2 inch and smaller, use gate or ball valves; for sectional valves 2-1/2 inch and larger, use gate or butterfly valves.

B. Shutoff Valves: Install shutoff valves on inlet of each plumbing equipment item, and on inlet of each
plumbing fixture, and elsewhere as indicated. For shutoff valves 2 inch and smaller, use gate or ball valves; for shutoff valves 2-1/2 inch and larger, use gate or butterfly valves.

C. Drain Valves: Install drain valves on each plumbing equipment item, located to completely drain equipment for service or repair. Install drain valves at the base of each riser, at low points of horizontal runs, and elsewhere as required to completely drain distribution piping system. For drain valves 2 inch and smaller, use gate or ball valves; for drain valves 2-1/2 inch and larger, use gate or butterfly valves.

D. Check Valves: Install swing check valves on discharge side of each pump, and elsewhere as indicated.

E. Hose Bibbs: Install on exposed piping where indicated, with vacuum breaker.

F. Sill Faucets: Install on concealed piping where indicated, with vacuum breaker.

3.10 INSTALLATION OF PIPING SPECIALTIES

A. Install backflow preventers at each connection to mechanical equipment and systems, and in compliance with the Uniform Plumbing Code (UPC) and authority having jurisdiction. Locate in same room as equipment being connected. Pipe relief outlet without valves, to nearest floor drain.

B. Install pressure regulating valves with inlet and outlet shutoff valves, and balance cock bypass. Install pressure gage on valve outlet.

3.11 EQUIPMENT CONNECTIONS

A. Piping Run outs to Fixtures: Provide hot and cold water piping run outs to fixtures of sizes indicated, but in no case smaller than required by UPC.

B. Mechanical Equipment Connections: Connect hot and cold water piping system to mechanical equipment as indicated. Provide shutoff valve and union for each connection, provide drain valve on drain connection. For connections 2-1/2 inch and larger, use flanges instead of unions.

3.12 FIELD QUALITY CONTROL

A. Inspections: Inspect water distribution piping as follows:
   1. Do not enclose, cover, or put into operation water distribution piping system until it has been inspected and approved by Architect.
   2. Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in, after system is roughed-in, and prior to setting fixtures.
   3. Final Inspection: Arrange for a final inspection to observe the tests specified below and to insure compliance with the requirements of the plumbing code.
   4. Re-inspections: Whenever the plumbing official finds that the piping system will not pass the test or inspection, make the required corrections and arrange for re-inspection.

3.13 DIELECTRIC UNION

A. Install dielectric waterway fitting at junction of copper and steel pipe.

3.14 PIPE SUPPORT

A. All flush valves and pipes to faucets shall be fastened di-electrically with “U” Clamps and bolts to a 4" high, 3/16" thick steel plate fastened to one stud on each side of the pipe.

3.15 JOINTS

A. All solder joints shall be made using Silverbrite 100 solder and wiped of excess solder before it cools.

3.16 DISINFECTION OF HOT AND COLD WATER LINES

A. Prior to connection of hot and cold water lines to existing lines, the plumbing contractor shall disinfect water lines in accordance with AWWA C601. Allow solution to remain in lines for twenty-four hours. Thoroughly flush lines, then make connections to existing lines. Operate all valves several times during the flushing procedure. Contractor to be responsible for the disinfecting of all lines inside and outside of the buildings, and obtain the necessary permits for the operation and certification of the water system.
   1. Submit water samples in sterile bottles to the authority having jurisdiction. Repeat the procedure if the biological examination made by the authority shows evidence of contamination.

END OF SECTION
SECTION 22 13 00 - FACILITY SANITARY SEWERAGE

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

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

B. Related Sections: Refer to Sections 22 10 00 and 23 00 00 for basic requirements for all mechanical work.

1.02 SCOPE

A. Complete system including connection to existing sewer system, as shown on the drawings and connection to all plumbing fixtures and drains. Contractor to verify location of connection points.

PART 2 PRODUCTS

See Section 22 10 00 “Plumbing Basic Materials and Methods” for Material Specifications.

2.01 PIPES

A. Sanitary and Waste Lines: All lines underground shall be either PVC DWV or standard cast iron with compression type gaskets. Lines above ground shall be either PVC DWV or standard weight cast iron with compression joints or no hub.

B. Sanitary Vent Piping Sanitary vent piping shall be either PVC DWV or service weight no hub cast iron or equivalent.

2.02 TRAPS

A. Continuous waste and vent: PVC DWV or chrome plated brass or cast iron.

2.03 STACK FLASHING

A. Made from 4 pound lead: 12” square base soldered to sleeve turned inside pipe at least 1” or as required for particular roof type.

2.04 CLEAN OUTS

A. Cleanouts by Zurn, Josam or Smith are acceptable but not limited to.

PART 3 EXECUTION

See Section 22 10 00 “Plumbing Basic Materials and Methods” for basic installation specifications.

3.01 GRADE

A. Piping 3” and smaller to be installed with a slope of not less than 1/4” per foot. Larger piping shall be installed with a slope of not less than 1/8” per foot. All piping inside or under the building shall be installed with a slope not less than 1/4” per foot.

END OF SECTION 22 13 00 - FACILITY SANITARY SEWERAGE
SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Bathtubs.
2. Faucets for lavatories, showers, and sinks.
3. Toilet seats.
4. Protective shielding guards.
5. Dishwasher air-gap fittings.
6. Disposers.
7. Water closets.
8. Lavatories.
10. Sinks.

B. Related Sections include the following:

1. Division 22 Section "Plumbing Insulation"

1.2 DEFINITIONS


B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

C. FRP: Fiberglass-reinforced plastic.

D. PMMA: Polymethyl methacrylate (acrylic) plastic.


1.3 SUBMITTALS

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

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.


D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

F. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
   1. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
   3. Vitreous-China Fixtures: ASME A112.19.2M.

G. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
   1. Faucets: ASME A112.18.1.

H. Comply with the following applicable standards and other requirements specified for shower faucets:
   1. Backflow Protection Devices for Hand-Held Showers: ASME A112.18.3M.
   2. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.

I. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
   2. Brass and Copper Supplies: ASME A112.18.1.

J. Comply with the following applicable standards and other requirements specified for miscellaneous components:
   1. Disposers: ASSE 1008 and UL 430.
   7. Off-Floor Fixture Supports: ASME A112.6.1M.

PART 2 - PRODUCTS
2.1 All adhesives, sealants, paints, and coatings applied onsite to a location inside the building weatherproofing system must comply with the low-emitting requirements listed in Section 018113.

2.2 LAVATORY FAUCETS

A. Lavatory Faucets:
1. 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:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated or a comparable product.
   a. Basis-of-Design: roFlo Model PF1011M
4. Description: Single-handle mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
   b. Finish: Polished chrome plate.
   c. Maximum Flow Rate: PF 1413129PK 1.5 GPM Female Aerator
   d. Centers: 4 inches (102 mm).
   e. Mounting: Deck, concealed.
   f. Valve Handle(s): Wrist blade, 4 inches (102 mm).
   g. Spout: Rigid type.
   h. Spout Outlet: Aerator.
   i. Operation: Compression, manual.
   j. Drain: Grid.
   k. Tempering Device: Not required.
   l. ADA compliant.

2.3 BATHTUBS

A. Bathtubs with shower.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Sterling Model 71121110 and 71121120 or comparable product by one of the following:
2. Fixture:
   b. Bathing Surface: Slip resistant according to ASTM F 462.
   c. Size: 60 by 32 inches with front apron, 18" bath depth.
   d. Color: White
   e. Drain Location: Left or right end, verify in field
   f. Drain: NPS 1-1/2 (DN 40); chrome-plated brass, pop-up waste and overflow.
3. Faucet: Basis-of-Design: Bayview Model 120-400 Washerless Tub and Shower Set with PF 14110WH shower head and ½" IPS Connection
5. Tub Filler: Chrome-plated-brass diverter spout.
6. Waste Fittings:
   b. Drain: Stainless steel or chrome-plated brass, removable strainer.
   c. Overflow: Chrome-plated-brass escutcheon with toggle drain-plug device.
   d. Drain Piping: NPS 1-1/2 (DN 40) cast-brass overflow, P-trap, and waste.
Program: SFCHA Santa Fe Community Living

2.4 SHOWERS

A. Shower base and faucet.

1. **Basis-of-Design Product**: Subject to compliance with requirements, provide Best Bath Model P6333A75B-P6333A2B or comparable product by one of the following:
2. **Standard**: ANSI Z124.1.2.
3. **Nominal Size**: Sizes may vary. Verify all dimensions in the field.
4. **Surround**: One piece.
5. **Surround**: One piece.
6. **Bathing Surface**: Slip resistant according to ASTM F 462.
7. **Color**: White.
8. **Faucet**: Basis-of-Design: Bayview Model 120-400 Washerless Tub and Shower Set with PF 14110WH shower head and ½” IPS Connection

2.5 SHOWER FAUCETS

A. Shower Faucets:

1. **Basis-of-Design Product**: Subject to compliance with requirements, provide the product indicated or a comparable product:
   a. **Basis-of-Design**: Bayview Model 120-400 Washerless Tub and Shower Set with PF 14110WH shower head and ½” IPS Connection
2. **Description**: Single-handle pressure-balanced valve. Include hot- and cold-water indicators; check stops; and shower head, arm, and flange. Coordinate faucet inlets with supplies and outlet with diverter valve.
   a. **Body Material**: Solid brass.
   b. **Finish**: Polished chrome plate.
   c. **Maximum Flow Rate**: 1.5 gpm (5.7 L/min), unless otherwise indicated.
   d. **Diverter Valve**: Not integral with mixing valve.
   e. **Mounting**: Concealed.
   f. **Backflow Protection Device for Hand-Held Shower**: Required (P-8A).
   g. **Operation**: Compression, manual.
   h. **Antiscald Device**: Integral with mixing valve.
   i. **Check Stops**: Check-valve type, integral with or attached to body; on hot- and cold-water supply connections.
   j. **Shower Head Type**: Ball joint; Hand held, slide-bar mounted at P-8A.
   k. **Shower Head Material**: Metallic with chrome-plated finish.
   l. **Spray Pattern**: Fixed.
   m. **Integral Volume Control**: Required.
   n. **Shower-Arm Flow-Control Fitting**: 1.5 gpm (5.7 L/min).
   o. **Temperature Indicator**: Not required.

2.6 SINK FAUCET

A. Sink Faucets:

1. **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:
2. **Manufacturers**: Subject to compliance with requirements, provide products by one of the following:
3. **Basis-of-Design Product:** Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
   a. American Standard Companies, Inc.
   b. Bradley Corporation.
   c. Chicago Faucets.
   d. Delta Faucet Company.
   e. Eljer.
   f. Elkay Manufacturing Co.
   g. Fisher Manufacturing Co.
   h. Grohe America, Inc.
   i. Just Manufacturing Company.
   j. Kohler Co.
   k. Moen, Inc.
   m. Speakman Company.
   n. T & S Brass and Bronze Works, Inc.
   o. Zurn Plumbing Products Group; Commercial Brass Operation.

4. **Description:** Kitchen faucet without spray, Service sink faucet with stops in shanks, vacuum breaker, hose-thread outlet, and pail hook, Bar sink faucet. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
   a. **Body Material:** Commercial, solid brass.
   b. **Finish:** Polished chrome plate.
   c. **Maximum Flow Rate:** 2.5 gpm (9.5 L/min.), unless otherwise indicated.
   d. **Mixing Valve:** Single control and Two-lever handle.
   e. **Centers:** 4 inches (102 mm), 8 inches (203 mm) Adjustable.
   f. **Mounting:** Deck; Back/wall exposed.
   g. **Handle(s):** Cross, four arm, Wrist blade, 4 inches (102 mm).
   h. **Spout Type:** Rigid, solid brass, Rigid, solid brass with wall brace, Swivel gooseneck.
   i. **Spout Outlet:** Aerator, Hose thread.
   j. **Vacuum Breaker:** Required.
   k. **Operation:** Compression, manual.
   l. **Drain:** Pop up.

2.7 **TOILET SEATS**

A. **Toilet Seats:**

1. **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:
2. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
3. **Basis-of-Design Product:** Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
   a. American Standard Companies, Inc.
   b. Bemis Manufacturing Company.
   c. Church Seats.
   d. Eljer.
   e. Kohler Co.
   f. Olsonite Corp.
   g. Sperzel.
4. Description: Toilet seat for water-closet-type fixture.
   a. Material: Molded, solid plastic with antimicrobial agent.
   b. Configuration: Open front without cover.
   c. Size: Elongated.
   d. Hinge Type: SS, self-sustaining.
   e. Class: Standard commercial.

2.8 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. 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:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
   a. Engineered Brass Co.
   b. Insul-Tect Products Co.; a Subsidiary of MVG Molded Products.
   c. McGuire Manufacturing Co., Inc.
   d. Plumberex Specialty Products Inc.
   e. TCI Products.
   f. TRUEBRO, Inc.
   g. Zurn Plumbing Products Group; Tubular Brass Plumbing Products Operation.

3. Description: Manufactured plastic wraps for covering plumbing fixture hot-water supply and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

2.9 DISPOSERS

A. Disposers:

1. 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:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
   a. American Standard Companies, Inc.
   b. In-Sink-Erator; a div. of Emerson Electric Co.
   c. KitchenAid.
   d. Premier

4. Description: Continuous-feed household, food-waste disposer. Include reset button; wall switch; corrosion-resistant chamber with jam-resistant, cutlery- or stainless-steel grinder or shredder; NPS 1-1/2 (DN 40) outlet; quick-mounting, stainless-steel sink flange; antisplash guard; and combination cover/stopper.
   a. Type: Continuous-feed household.
   b. Motor: 115-V ac, 1725 rpm, 1/2 hp with overload protection.

2.10 WATER CLOSETS

A. Water Closets:

1. 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:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
   a. American Standard Companies, Inc.
   b. Briggs Plumbing Products, Inc.
   c. Crane Plumbing, L.L.C./Fiat Products.
   d. Eljer.
   e. Kohler Co.
   f. TOTO USA, Inc.

4. Description: Accessible, floor mounted pressure assisted flush tank.

5. Style: Pressure assisted flush tank.
   a. Bowl Type: Elongated with siphon-jet design. Include bolt caps matching fixture.
   b. Height: Standard or Accessible.
   c. Design Consumption: 1.28 gpf

2.11 LAVATORIES

A. Lavatories:

1. 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:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
   a. American Standard Companies, Inc.
   b. Commercial Enameling Company.
   c. Eljer.
   d. Kohler Co.

4. Description: Accessible, wall-mounting, vitreous-china fixture.
   a. Type: Ledge back.
   b. Size: 19 by 17 inches (483 by 456 mm) rectangular.
   c. Faucet Hole Punching: Three holes, 2-inch (51-mm) centers.
   d. Faucet Hole Location: Top.
   e. Pedestal: Not required.
   g. Supplies: NPS 3/8 (DN 10) chrome-plated copper with stops.
   h. Drain: Grid with offset waste.

2.12 KITCHEN SINKS

A. Kitchen Sinks:

1. 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:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated or a comparable product.
   a. Basis-of-Design: ProFlo PF 332274
4. Description: One-bowl, residential, counter-mounting, stainless-steel kitchen sink.
   a. Overall Dimensions: 33'x22
   b. Metal Thickness: 20 Gauge
   c. Bowl: Double Bowl
   d. Dimensions: 14'x16''x 7'' deep
      1) Drain: 3-1/2-inch (89-mm).
      2) Location: Centered in bowl.
   e. Sink Faucet: Basis-of-Design: ProFlo PF LL2001M with PF143129 1.5 GPM female aerator
   f. Supplies: NPS 1/2 (DN 15) chrome-plated copper with stops.
   g. Drain Piping: NPS 1-1/2 (DN 40) chrome-plated, cast-brass P-trap; 0.045-inch (1.1-mm-) thick tubular brass waste to wall; and wall escutcheon(s).
   h. Disposer: See fixture schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
   1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
   2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
   3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports. D.
   Install wall-mounting fixtures with tubular waste piping attached to supports.

E. Install fixtures level and plumb according to roughing-in drawings.

F. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

G. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

H. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

I. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

J. Install toilet seats on water closets.

K. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

L. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.

M. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
N. Install shower flow-control fittings with specified maximum flow rates in shower arms. O.

Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.
2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

P. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.

Q. Install escutcheons at piping wall and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."

R. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

E. Install fresh batteries in sensor-operated mechanisms.

3.4 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. Related Sections: Special and specific electrical requirements are specified within each respective equipment specification section.

1.02 DESCRIPTION OF MECHANICAL WORK

A. Furnish all labor and material necessary to install a complete HVAC system, including installation of cooling coils, condensers, and furnaces, diffusers, zone dampers, thermostats, controls, exhaust fans, louvers, and associated metal air ducts.

B. Furnish all labor and material necessary to install a complete plumbing system, including plumbing fixtures, water and sewer distribution, mechanical equipment supports, gas piping and connection to all utilities.

1.03 RELATED WORK IN OTHER DIVISIONS

A. Electrical Wiring: All electrical wiring for support of mechanical equipment is handled under Division 26. However, temperature and safety control wiring shall be under this division. Wiring diagrams, electrical motors, starters where indicated, supervision and responsibility for correct installation shall be furnished under this division.

B. Painting of Equipment, Piping, and Accessories: Piping and other mechanical items requiring field painting shall be handled under Division 9 unless otherwise indicated. It is this Contractor's responsibility to keep all mechanical items clean and free from corrosion.

C. Chases and Openings: The location of all inserts and openings shall be determined and coordinated with other divisions in ample time to avoid damaging new construction.

D. Curbs: Air handling unit curbs are under this division.

E. Roof Flashing of Ducts and Curbs: Flashing of ducts and curbs is to be provided under Division 7. Vent flashing in its entirety shall be work of this division.

1.04 QUALITY ASSURANCE

A. Codes and Applicable Industry Standards: All work shall be executed in accordance with local and state codes, ordinances, and regulations governing the particular class of work involved. This Contractor shall be responsible for the final execution of the work under this heading to suit these requirements.

1. Contract documents take precedence when they are more stringent than codes, ordinances, standards and statutes. Codes, ordinances, standards, and statutes take precedence when they are more stringent or conflict with Drawings and Specifications. The following industry standards, specifications, and codes are minimum requirements (latest issue as of date of Contract):
   a. Applicable county and state mechanical, electrical, gas, plumbing, health and sanitary codes, laws, and ordinances.
   b. National Electrical Manufacturer's Association Standards.
   d. Underwriters Laboratories, Inc. Standards.
   e. American National Standards Institute.
   g. Standards and requirements of local utility companies.
   h. National Fire Protection Association Standards.
   i. American Society of Mechanical Engineers Boiler and Pressure Vessel Codes.
   j. Occupational Safety and Health Act.
   k. Uniform Mechanical and Plumbing Codes.
   m. ANSI Power Piping Code.
n. Commercial and Industrial Insulation Standards (MICA).
p. Applicable publications of Sheet-metal and Air Conditioning Contractor’s National Association, Inc. (SMANCA).

B. Supervision: The Contractor shall furnish a competent superintendent at all times with the experience required for this type and size of project.

C. Workmanship: Labor shall be performed in a workmanlike manner by mechanics skilled in their particular trade. Pipe and equipment shall be installed square and plumb and accessible for proper operation and service. Installation shall be consistent in completeness and appearance whether enclosed or exposed.

D. Supplier Responsibility: Each manufacturer’s representative for equipment being installed on this project shall be responsible for providing qualified personnel at the job site at anytime during the construction phase and during the one year warranty period when requested by an authorized project representative to do so. Each supplier, whether furnishing equipment as specified or as a substitution shall be responsible for certifying the equipment is properly installed and that the warranty is valid. Submit written reports on the installation, start-up, and equipment performance.

1.05 PACKAGED EQUIPMENT TESTING

A. All packaged equipment shall be independently Third Party labeled as a system for its intended use by a Nationally Recognized Testing Laboratory (NRTL) in accordance with OSHA Federal Regulations 29CFR1910.399, NFPA Pamphlet 70, and National Electric Code (NEC), Article 90-7.

1.06 SUBMITTALS

A. General: A proposed item that is submitted by the Contractor and “Rejected” by the Engineer shall be resubmitted by the Contractor and returned by the Engineer with a “Revise and Resubmit” note with one opportunity for a correct submittal. If the proposed item is not corrected, it will be returned with a “Rejected” note, and the Contractor will be obligated to submit and supply the item specified in the contract documents.

B. Product Listing:
1. Prepare listing of major mechanical equipment and materials for the project.
2. Provide all information requested.
3. Submit this listing as a part of the submittal requirement specified in the Division 1 Section: PRODUCTS AND SUBSTITUTION.
4. When two or more items of same materials or equipment are required (plumbing fixtures, pumps, valves, air conditioning units, etc.) they shall be of the same manufacturer. Product manufacturer’s uniformity does not apply to raw materials, pipe, tube, fittings (except flanged and grooved pipes), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in the Work, except as otherwise indicated.
5. Provide products which are compatible within systems and other connected items.

C. Shop Drawings:
1. Scope: Shop drawings and/or brochures are required for, but are not limited to, the following items: Plumbing fixtures, water heater, insulation, HVAC components, unit heaters, exhaust fans, grilles and diffusers, relief hoods, etc.
   a. Submit shop drawings as specified in Division 1. Furnish seven (7) sets of shop drawings, manufacturer’s brochures and lists of materials furnished under this Division.
2. Requirements: Shop drawings and brochures shall consist of published ratings or capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturers installation drawings, and other pertinent data. Where the literature submitted covers a group or series of similar items, the item under consideration shall be clearly indicated.
3. Certification: Shop drawings shall be accompanied by certification from this Contractor that shop drawings have been checked by him for compliance with Contract Documents.
4. Definition of Approval: Approval of these submittals shall not be construed as releasing the Contractor from further responsibility. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. All materials and equipment shall be subject to final acceptance by the Architect at the completion of construction and adjustment of the systems.

D. As-Built Drawings: Provide and maintain, on the job, a complete and accurate record set of prints showing all mechanical work. Keep record set up-to-date as work progresses. Indicate clearly and correctly all service and utility lines with size, invert elevations, buried pipe locations, and location of all
equipment. Upon completion of the work, furnish to the Architect-Engineer two (2) neat, legible copies of As-Built Drawings. Drawings shall be dated and signed by the Contractor.

E. Operating Instructions and Service Manual: The Contractor shall carefully prepare an operating instruction and service manual for the entire system, including all equipment. The service manuals shall be assembled in hard cover, three-ring binders. The service manual shall be submitted for approval at least thirty (30) days prior to completion of the work. Failure to submit this item will delay final inspection and acceptance of the work by the Architect-Engineer.

1. The form in which the service manual is to be presented shall be subject to the approval of the Architect-Engineer. All items in the manual shall be numbered in succession.
2. The following items, together with any other necessary pertinent data, shall be included in the manual. This is not complete and is to be used as a guide:
   a. Index to contents with item numbers.
   b. Part numbers of all replaceable items.
   c. Manufacturer's cut sheets and rating tables, including brochures on all equipment installed.
   d. Oiling, lubrication, and greasing data.
   e. Test data on all equipment.
   f. Belt sizes, types, and lengths.
   g. Serial numbers of all principle pieces of equipment.
   h. Manufacturer's, supplier's, and subcontractor's names, addresses, and telephone numbers.
   i. Written guarantees.
   j. "As-Builts" corrected and completed to date.
3. After approval of the manual by the Architect-Engineer, four (4) copies of each shall be furnished to the Architect-Engineer for distribution.
4. The operating instructions and service manual shall be considered a part of the final inspection and shall be submitted for approval at least fifteen (15) days in advance of request for final inspection.

1.07 DRAWINGS

A. Drawings and Specifications shall be considered as cooperative, and work or materials called for by one and not mentioned by the other shall be done and furnished as though treated by both. Where discrepancies occur between Plans and Specification, the most stringent shall govern.

B. In case of discrepancies in figures, drawings, or specifications, the Engineer shall be notified immediately and his decision shall determine the necessary adjustment. Without such decision, said discrepancies shall not be adjusted by the Contractor except at his expense; and, in case of any settlement or any compilation arising from such adjustment, the Contractor shall bear all extra expense involved.

C. Should it appear that the work intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the Drawings or Specifications, the Contractor shall apply to the Engineer for such further drawings or explanation as may be necessary, allowing a reasonable time for the Engineer to supply same, and the Contractor shall conform to same as part of the Contract.

D. Should any doubt or question arise in respect to the true meaning of the drawings or specifications, the question shall be posed to the Engineer, whose decision shall be final and conclusive.

E. All piping and all ducts in the finished area of the building shall be run concealed in chases, furring, suspended ceilings, etc., unless noted of directed otherwise. Should any condition arise which would cause any piping or duct to be exposed in furnished areas, it shall immediately be called to the Engineer's attention, and the Contractor shall rearrange his work as directed to facilitate its concealment. In unfurnished spaces and equipment rooms, all pipe lines shall be run to a continuous grade and square to the building.

F. The Contractor shall thoroughly acquaint himself with the details of the building plans and construction before submitting his bid as no allowance will be made because of the contractor's unfamiliarity with these details. Place all inserts required for concrete construction in place in the forms before concrete is poured and in masonry walls while they are in construction. All concealed piping and ducts shall be installed prior to the time the chases and furring are fabricated.

G. The mechanical plans do not give details to the elevations of piping, exact locations, etc., and do not show all offsets, control lines, pilot lines, and other installation details. The Contractor shall carefully lay out his work at the site to conform to structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to the details of installation supplied by the manufacturer of the equipment installed, and thereby to provide an integrated, satisfactory operating installation.
H. Should the particular equipment proposed for installation require other space conditions than those indicated on the drawings, the Contractor shall be bound by the requirements of the 22 10 00 PLUMBING BASIC MATERIAL AND METHODS and SUBMITTALS sections. Should changes become necessary on account of failure too comply with these details, the Contractor shall make necessary changes at his (the Contractor's) own expense. The Contractor shall confirm that the space provided for the mechanical equipment is large enough for said equipment. If not, the Contractor shall immediately notify the Architect that the equipment space provided is not sufficient.

1.08 PERMITS
A. Permits necessary for performance of the work shall be secured and paid for the Contractor. All utility connections, extensions, meter sets and fees for water, sanitary, sewer, and natural gas shall be paid for by the Contractor, unless otherwise specified herein.

1.09 EXAMINATION OF PREMISES
A. Visit building sites and ascertain existing conditions which will affect this contract.

1.10 EXISTING SERVICES
A. The Contractor shall carefully examine the drawings and specifications, visit the site of the work, fully inform himself of all existing conditions, dimensions, and limitations before commencing the work.
B. The locations of existing underground utilities are shown in an approximate way only, if at all on the mechanical drawings. The Contractor shall determine the exact location of all existing utilities before commencing the work. He agrees to be fully informed of and responsible for any and all damages which might occur by his failure to exactly locate and preserve any and all underground utilities.
C. The Contractor shall also notify all corporations, companies, individuals, or local authorities owning or having jurisdiction over conduits, wired, piped, or other equipment which are not needed or which interfere in any manner with the execution of this contract.

1.11 INTERFERENCE
A. The Contractor shall refer to other sections of these specifications covering the work of other trades which must be carried out in conjunction with the mechanical work so that the construction operations can proceed without interference, delay, or absence of coordination.

1.12 VIBRATION AND NOISE
A. Each of the various pieces of equipment shall operate without objectionable vibration or noise. All rotating equipment shall be in static and dynamic balance and shall be mounted, supported and fastened so that no equipment vibration will be transmitted the building. The specific type of vibration isolation shall be submitted to the Architect for his approval. If in the opinion of the Architect or Owner, the objectionable vibration is transmitted to the building, the Contractor shall execute remedial measures as may be necessary to eliminate such unsatisfactory conditions. The work and material thereby required to correct this condition shall be furnished and performed at the Contractor's expense.

1.13 DESIGN CONDITIONS (Temperature and Altitude)
A. The performance of the equipment and components for the heating and ventilating system shall be guaranteed by the Contractor to meet the following conditions on which basis the systems were designed.

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<thead>
<tr>
<th></th>
<th>Winter</th>
<th>Summer</th>
<th>Altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Temp.</td>
<td>60 deg. F</td>
<td>74 deg. F</td>
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1.14 GUARANTEE - WARRANTY
A. The Contractor shall guarantee all workmanship, materials, and equipment for one year from the date of acceptance, or one complete heating and the cooling cycle, whichever is longer. In the event defects appear during this period, the Contractor shall immediately, upon receipt of notice, make all necessary improvements at his expense.

1.15 REQUIREMENTS FOR ACCEPTANCE INSPECTION
A. Site Inspections: All of the following items must be completed for each building prior to final inspection.
No exceptions will be made.

B. Cleaning equipment and premises: Thoroughly clean all parts of the piping, valves and equipment. Exposed parts which are to be painted shall be thoroughly cleaned of cement, plaster, oil, grease spots, and all other materials. All surfaces shall be thoroughly wiped clean and all cracks and corners scraped clean.

C. Final Inspection: When the Contractor notifies the Architect-Engineer that the project is ready for final inspection, the Architect-Engineer will visit the job site and will prepare a final punch list of all items that shall be finished or corrected before the project can be accepted.
1. When the Contractor notifies the Architect-Engineer that all items on the above punch list have been completed and corrected, the Architect-Engineer will visit the project to ascertain that all items on the punch list have been corrected and can be accepted.
2. The Contractor shall pay the Architect-Engineer for all other successive trips to the project that are made necessary because not all the items on the punch list on the punch list were not corrected at the second time of the second visit described above.
3. The Architect-Engineer will charge the Contractor according to the Architect-Engineer’s current fee, including transportation and subsistence.

PART 2 PRODUCTS

2.01 PRODUCT OPTIONS AND SUBSTITUTIONS
A. Refer to the Instructions to bidders and the division 1 Section “PRODUCTS AND SUBSTITUTION” for requirements in selecting substitutions.

2.02 QUALITY OF MATERIALS
A. All equipment and materials shall be new, and shall be the standard product of manufacturer’s regularly engaged in the production of plumbing, heating, ventilation, and air conditioning and shall be the manufacturer’s latest design. Specific equipment, shown in schedules, on drawings, and specified herein, is set forth standard of quality and operation. Equal equipment shall be determined by the Architect-Engineer, and those items deemed equal shall be specifically approved by the Architect-Engineer.

2.03 V-BELT DRIVES
A. V-belt drives shall be of fabric and of rubber construction of approved manufacturer. Multiple belts shall be matched sets and all belts shall be adjusted to drive the apparatus properly and to prevent slippage and undue wear in starting. Unless otherwise specified in the Mechanical Equipment Schedule, drive horsepower ratings shall be 150 percent of the specified motor nameplate rating. Motor sheaves shall be adjusted unless otherwise specified in the Equipment Schedule on the Drawings. All belts shall be standard strength unless otherwise required. All V-belt driven equipment shall have a label showing type and size of belt required fastened to the belt guard or other conspicuous location.

2.04 ACCESS PANELS
A. Shall be similar to Milcor, size as required for concealed valves, equipment, and similar items requiring accessibility. Notify the General Contractor and Architect of each access panel location and the required size. Panels shall be proper type for ceiling or wall in which they are installed. The panels shall be furnished under this section of the Specifications, unless otherwise directed, but shall be coordinated to be compatible with walls and ceilings furnished under other sections.

2.05 ELECTRICAL MOTORS:
A. All electrical motor characteristics (voltage, etc.) Must be verified prior to ordering.
B. All motors shall be built in accordance with the current applicable IEEE, ASA, and NEMA standards. All general purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations unless otherwise shown on the contract documents. All motors to have minimum power factor of 85% or have switched to corrections to 90%.
C. Unless indicated otherwise, motors shall be NEMA design B with a service factor of 1.15 with 40 deg. C. rise and total temperature rise of 65 deg. C. ambient when powered from the required voltage specified for the motor. Motors located in areas exceeding 40 deg. C. ambient shall be factory rated for the ambient temperature of the motor environment. Single phase motors shall be NEMA type N split phase induction motors with built-in thermal protectors. Single phase motors for loads requiring high starting torque shall be capacitor start induction motors.
D. If the Contractor proposes to furnish motors varying in horse power and/or characteristics from those specified, he shall first inform the Architect-Engineer of the change and shall coordinate the change with Electrical Contractor and shall pay all additional charges in connection with the change.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING:
   A. Deliver products properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.
   B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
   C. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

3.02 INSTALLATION
   A. All work shall be completely installed as required by this section, the local and state ordinances and safety orders, and OSHA regulations. The workmanship shall be first class and the work shall keep up with the construction.

3.03 WORK LAYOUT
   A. Conform to structural conditions and to manufacturer’s recommendations. All pipe runs shall be concealed where possible with continuous grade square to building.

3.04 FIELD MEASUREMENTS
   A. The Contractor shall verify the dimensions covering the mechanical work at the building. No extra compensation shall be claimed or allowed on account of difference between actual dimensions and those indicated on the Drawings. The Contractor shall examine the adjoining work on which the mechanical work is dependent for maximum efficiency, and shall report any work which must be corrected. No waiver of responsibility for defective work shall be claimed or allowed due to failure to report unfavorable work conditions affecting Mechanical Work.

3.05 MANUFACTURER’S DIRECTIONS
   A. The Contractor shall install all equipment in strict accordance with all directions recommendations furnished by the manufacturer. Where such directions are in conflict with the plans and specifications, the Contractor shall report such conflicts to the Architect-Engineer, who shall make such compromises as he deems necessary and desirable.

3.06 DAMAGED WORK
   A. Replace or repair to the Architect-Engineer’s satisfaction at the Contractor’s expense all damaged work.

3.07 EXCAVATION AND BACKFILL OF TRENCHES
   A. All excavation, trenches, and backfilling required for the mechanical installation shall be provided by the Contractor.
   B. All piping laid in trenches shall be bedded evenly and firmly. The trench bed shall consist of undisturbed native soil or shall be compacted to an equally firm bedding. See drawings. Recesses shall be formed below the trench bed to receive the flange or hub of each section of pipe or fitting.
   C. Where firm bedding is not obtainable, gravel fill compacted with water, or low strength concrete fill around the bottom half of the pipe shall be used.
   D. All trenches and excavations shall be backfilled as soon as possible after inspection. All backfill shall be compacted in layers in such areas as streets, driveways, or alleys, or walks to prevent settling. Backfill shall be neither excessively wet nor dry. Puddling or flooding shall not be used except in sand or gravel bearing soil, and as specifically approved.
   E. Trenches shall be made 8" wider than the pipe on each side of the pipe and shall be repaired to match
the finish surface of the area, and flush with existing grade.

F. Curb cuts, asphalt, and concrete patching, etc., shall be part of the Contractor’s responsibility.

G. No extra payment shall be made for rock excavation. Should rock be encountered, it shall be excavated to a depth of 6" below the bottom of the pipe, and before laying the pipe, the spaces between the bottom of the pipe and the rock surface shall be filled with gravel, thoroughly tamped.

H. Hand excavation shall be done in the vicinity of each existing buried utility and where necessary or directed for safety and to avoid damage to the buried utilities.

I. Surplus materials shall be hauled from the project by the contractor at his expense.

3.08 CUTTING AND PATCHING

A. This Article specifies the cutting and patching of mechanical equipment, components, and material to include removal and legal disposal of selected materials, components, and equipment.

B. Refer to the Division 1 section: PROCEDURES AND CONTROLS for general requirements for cutting materials.

C. Refer to division 26 for requirements for cutting and patching electrical equipment, components, and materials.

D. Do not endanger or damage installed Work through procedures and processes of cutting or patching.

E. Arrange for repairs required to restore other Work, because of damages caused as a result of mechanical installations.

F. No additional compensation will be authorized for cutting and patching Work that is necessitated by ill-timed, defective, or non-conforming installations.

G. Perform cutting, fitting, and patching of mechanical equipment materials required to:
   1. Uncover Work to provide for installation of ill-timed Work;
   2. Remove and replace defective Work;
   3. Remove and replace Work not conforming to requirements of the Contract Documents;
   4. Removed samples of installed Work as specified for testing;
   5. Installed equipment and materials in existing structures;
   6. Upon written instructions from the Architect-Engineer, uncover and restore Work to provide for Architect-Engineer observation of concealed Work.

H. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

I. Locate, identify, and protect mechanical and electrical services passing through remodel or demolition area and required to be maintained operational. When transit services must be interrupted, provide temporary services for the affected areas and notify the owner prior to changeover.

3.09 PIPING AND DUCT SUPPORTS

A. The Contractor shall be required to install all pipe and duct supports, including all necessary bracing, as detailed and shown on the drawings. Failure to exactly follow the support methods depicted on the drawings will result in the Contractor’s removal and proper reinstallation of related pipes, ducts, and supports. Install piping supports per UPC and UMC, unless indicated otherwise.

3.10 LUBRICATION

A. The Contractor shall be required to provide all grease and oil for the operation of the equipment until final acceptance. The Contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up to the date of final acceptance of the equipment. The Contractor shall be required to protect all bearings and shafts to prevent corrosion. All motors and other equipment shall be provided with covers as requires for proper protection during construction.

3.11 TEMPORARY UTILITIES

A. The Contractor shall provide utilities required for the proper execution and protection of the Work as follows:
   1. All temporary light and power complete with all wiring, lamps, and similar equipment, as required for completion of the Work.
2. Temporary water lines for construction, testing, drinking, protection, etc.
3. Gas, if required, for temporary heating and testing.
4. Temporary heating by suitable means to provide protection to the Work, comfort to the workers where necessary required, for making any necessary tests, and to dry materials when necessary to prevent delay in Work.
5. The cost of services used (gas, water, and electricity) shall be borne by the Contractor.
6. The Contractor shall arrange for and pay for all connections to existing services and for supplies, materials, etc., required to provide these utilities.

3.12 UNKNOWN UTILITIES AND OBSTACLES

A. If any unknown and un-chartered utilities are encountered during excavation, promptly notify the Architect-Engineer and wait for his instruction before proceeding.

B. If it is ascertained by the Architect-Engineer that such utility line is abandoned, the Contractor shall properly cap the line at a depth of 12” or more below the finish grade.

3.13 PROJECT CLOSE-OUT

A. Final Acceptance:
   1. Replace all disposable filters used during the construction period with new filters and clean and reinstall all cleanable filters.
   2. Deliver to the Architect-Engineer a certified balancing report per Section 23 05 93.

B. Final Operation: Upon completion of the installation of the equipment, the Contractor shall place a competent person in charge, who shall operate all systems in the presence of the Owner’s designated representative, instructing the Owner’s representative on all details of operation and maintenance.

C. Upon request of the Owner, instructions form manufacturer’s representatives shall be given during this period. All arrangements for operation periods shall be made through the Owner’s representative.

D. Record Drawings: The Contractor shall, during the execution of the Work, maintain two complete sets of drawings upon which all dimensional locations of equipment, ductwork, piping, and all deviations and/or changes in the work shall be recorded. Water, gas, and sanitary sewer mains (and all other piping) shall be accurately located by dimensions. These “record” drawings shall be delivered to the Architect-Engineer in good condition upon the completion and final acceptance of the Work and before the final payment is made.

3.14 CLEANING AND REMOVAL OF RUBBISH

E. The work of each section shall include removing all rubbish, surplus materials, scaffolding, barricades, temporary walks, and rubbish from the project promptly upon completion of work. Leave the area of operations completely clean and free of these items.

F. All exposed heating, plumbing, and other equipment, piping, apparatus, walls, floors, ceilings, etc., and material shall be cleaned of oil and grease spots and left smooth and clean. All finished surfaces shall be cleaned and polished.

END OF SECTION 23 00 00
PART 1  GENERAL

1.01  RELATED DOCUMENTS
A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Conditions and Division 1 Specifications, apply to work of this section.
B. Related Sections: Refer to Sections 22 10 00 and 23 00 00 for basic requirements for all mechanical work.

1.02  SUMMARY
A. This section specifies the requirements and procedures for testing and balancing the mechanical system.
B. Test, adjust and balance the following mechanical systems; all packaged units, diffusers, exhaust fans, cooling units, heating units, and temperature control.
C. This section does not include the testing of pressure vessels for compliance with safety codes. Nor specifications for materials and installation of adjusting and balancing devices. If devices must be added to achieve proper adjusting and balancing, refer to the respective system sections for materials and installation.

1.03  DEFINITIONS
A. System testing adjusting and balancing is the process of checking and adjusting all building environmental systems to produce the design objectives as stated in the contract documents.
B. Test - to determine quantitative performance of equipment.
C. Adjust - to regulate the fluid flow rate.
D. Balance - to proportion flows within the distribution system according to specified design quantities.
E. Procedure - standardized approach and execution of the work.
F. Report forms - test sheets arranged in logical order for the collection of data, which will form a permanent record.
G. Terminal - the point where the controlled fluid enters or leaves the distribution system.
H. Main - duct or pipe containing part of the systems capacity.
I. Branch main - duct or pipe serving two or more terminals.
J. Branch - duct or pipe serving one terminal.

1.04  SUBMITTALS:
A. Submit proof that the testing agency meets the qualification listed.
B. Submit proof that the T & B engineer meets required qualifications.
C. Submit a synopsis of the testing, adjusting and balancing procedure to be used.
D. Submit maintenance and operating data that include how to test, adjust and balance the system.
E. Submit sample forms if other than standard NEBB forms.
F. Submit certified testing, adjusting and balancing reports bearing the seal and signature of the T&B
engineer. The reports shall be certified proof that the systems have been tested, adjusted and balanced in accordance with the referenced standards. Also, the reports must be an accurate representation of the systems that have been installed and a true representation of how the systems are operating at the end of the test and balance procedure.

G. Submit two copies of a draft report on approved forms upon completion of the testing, adjusting, and balancing. Draft reports may be handwritten. Upon verification and approval of the draft reports prepare final report, type written, organized and formatted as specified in this section. Submit three copies of final report.

H. Report format shall be those standard forms prepared according to the referenced standard for each item and system tested. Bind reports complete with schematic diagrams and other data in reinforced 3 ring binders. Provide binding edge labels with project identification and title description of contents. Divide binder into divisions; general information, air systems, and water systems.

I. In the general information and summary identify testing agency, contractor, owner, architect, project, address and telephone. Also include a certification sheet with seal and signature, and a list of instrumentation and procedures, and proof of calibration.

J. The remainder of the report shall contain as a minimum, the information indicated on the report forms prepared by the NEBB for each item and system. Prepare a schematic for each item and system. Submit proof that all required instrumentation has been calibrated.

1.05 QUALITY ASSURANCE:
A. Test and Balance Engineers to be a professional engineer, either on the staff or as a consultant or an NEBB certified technician in the State of New Mexico, and having at least 3 years experience.
B. The testing agency shall be certified by the National Environmental Balancing Bureau (NEBB), in those testing and balancing disciplines required for this project, or having at least one professional engineer on staff.
D. Prior to beginning of testing, schedule and conduct a conference with the Architect, Contractor, and representatives of the equipment installer.

1.06 PROJECT CONDITIONS:
A. Systems shall be fully operational before beginning procedures.

1.07 SEQUENCING AND SCHEDULING:
A. Test and balance the heating system during the winter season and air conditioning during the summer season, including at least a period of operation at outside conditions within 5 degrees wet bulb temperature of maximum summer design conditions and within 10 degrees of winter design.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION

3.01 PRELIMINARY PROCEDURES:
A. Before operating the system, perform the following: obtain design drawings and specifications, and approved copies of shop drawings. Compare design to final installation. Inspect the systems. Check filters for cleanliness. Check dampers for correct position. Prepare test sheets for fans and outlets. Determine best locations for duct traverses. Place outlet dampers in full open. As built system schematics. Lubricate motors. Check fan belt tension and rotation.

3.02 MEASUREMENTS
A. Provide all required instrumentation to obtain proper measurements.
B. Provide instruments that meet the requirements of the references.
C. Use the instruments as recommended by the manufacturer.
D. Use instruments with minimum scale and maximum divisions for the value being tested.
E. When using average values, take sufficient quantities of readings which will result in a repeatability error of less than 5%.
F. Take all readings at eye level.
G. Use pulsation dampeners where necessary.

3.03 PERFORMING TESTING, ADJUSTING AND BALANCING:
A. Perform testing and balancing on each system shown on the contract documents.
B. Cut insulation as required for probes. After measurements have been taken, patch to match original installation.
C. Test for leaks. Repair leaks that were discovered.
D. Mark equipment settings and control positions to show final settings.
E. Retest and balance subsequent to significant modifications to system and resubmit test results.

3.04 RECORD AND FINAL DATA:
A. Record all data obtained during testing on recommended forms. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

3.05 DEMONSTRATION:
A. Train the owner’s maintenance personnel on troubleshooting procedures. Review, with the owner’s personnel, operating and maintenance procedures. Schedule training with the Owner through the Architect, seven days in advance of the training.

END OF SECTION 23 05 93
PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. The general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specifications sections, apply to the work specified in this section.

B. Divisions 22 10 00 and 23 00 00 apply to work of this section.

1.02 OVERALL REQUIREMENTS:

A. All material shall be new and clean when installed.

B. All insulation material and the associated mastic, adhesives, jackets, etc, shall be fire resistant, conforming to NFPA-225, ASTM#-84, and UL 723.

C. Pipe insulation shall include in-line valves, strainers, fittings, and other misc. appurtenances as required to provide a drip-proof installation. Where occasional access is required, such as with strainers and pumps, insulation shall be fabricated of two pieces or otherwise made sectional to allow such access without damage to the insulation or jacket.

D. All indoor insulation work (insulation, jacket or facing and adhesive used to adhere jacket or facing to the insulation) shall have composite fire and smoke hazard ratings, as tested by procedure ASTM E-84, NFPA 255 and UL 73. Ratings shall not exceed Flame Spread of 25, Fuel Contributed of 50 and Smoke Development of 50. Accessories, such as adhesives, mastics, cements tapes and cloths for fittings shall have component rating as listed above.

E. Insulation shall be continuous through wall and ceiling openings and sleeves.

F. Specified mastics, adhesives and coatings shall be applied in strict accordance with the manufacturer's instructions, including recommended coverage.

G. All domestic cold water and non-potable water concealed above ceilings or within 24 inches of an outside wall or concealed in partitions, in basement areas, or penthouses shall be insulated.

1.03 WORK INCLUDED

A. Materials and operations required for the installation of insulation for domestic cold water, non-potable cold water, and hot water, hot water circulating, hot water heating, low and high pressure steam (interior only), hot condensate, chilled water, cold condensate, roof drain, dual temperature, and refrigerant piping. Also included converters and hot water storage tanks, air conditioning ducts, duct lining for ductwork and plenums, underground chilled water and hot water.

PART 2 PRODUCTS

2.01 PIPE INSULATION MATERIAL:

A. Above grade insulation shall be 650 degree high density sectional fiberglass insulation R= 4.35/in. Maximum with factory applied FRJ vapor barrier reinforced jacket having self sealing laps and joint strips.

B. Elbows and fittings shall be insulated with premolded fiberglass fittings having an equivalent thickness to the adjacent pipe. Cover insulation with premolded PVC jacketing and seal edges with self sealing joint strips.

ASHRAE 90-80

RECOMMENDED ECONOMIC THICKNESS

<table>
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<tr>
<th>PIPING SYSTEM</th>
<th>TEMPERATURE, F</th>
<th>PIPE SIZE 1&quot; &amp; Below</th>
<th>PIPE SIZE 1-1/2&quot; to 2&quot;</th>
<th>PIPE SIZE 2-1/2&quot; to 4&quot;</th>
<th>PIPE SIZE Above 4&quot;</th>
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<td>Plumbing</td>
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<td>1.0</td>
<td>1.0</td>
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</tbody>
</table>
2.02 DUCTWORK

A. List of Materials and Finishes:

1. Air Conditioning, Supply/Return, Exhaust, Air Intake, Plenums, and Rectangular Ducts Within Mechanical Equipment Room:
   a. Shall be 1” thick 705 rigid board applied with mechanical fasteners. Seal all joints and breaks with 3” wide ASJ tape. All punctures shall be sealed with ASJ patches. Where stiffening angles are 1-1/2”, insulation shall be 1-1/2” thick.

2. All Rectangular Supply and Return Ducts for Heating, Cooling, Dual Temperature and Ventilating:
   a. A 2” thick 3/4 lb./cu. ft. density with a facing of reinforced foil draft laminate. Use OCF All Service Wrap or approved equal. The vapor barrier shall be legibly printed by the manufacturer to show flame spread smoke developed, nominal thickness and type of insulation. The duct wrap shall be applied over clear dry sheet metal duct work that has been sealed air-tight at all seams and joints. Duct Wrap shall be installed to allow maximum fullness at corners (avoid excessive compression).
   b. Use manufacturer’s suggested “stretchout” information. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped a minimum of 2”. All seams shall be stapled approximately 6” on center with outward clinching staples, then sealed with a foil vapor barrier tape. Where ducts are over 24” in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18” centers (maximum), to prevent sagging of insulation. Seal penetrations so as to provide a vapor-tight system.

3. All connections to Fiberglass Flexible Duct shall be installed in sizes and locations where indicated on drawings. The flexible duct shall have: maximum interior air temperature of 200°F, maximum static pressure 10”, maximum negative air pressure 1/2” a C value of .23 BTU/hr./ft.2/°F, or approved equal.

B. Duct Lining for Rectangular heating and Cooling Ducts:

1. Shall be 1” thick 3 lb./cu./ft. density with a black fire and mold resistant coating. Use Aeroflex or Engineers approved equal.
   a. Application:
      1) All portions of duct designated to receive duct liner shall be completely covered with Duct Liner. Transverse joints shall be neatly butted and there shall be no interruptions or gaps.
      2) The black coated surface of the Duct Liner shall face the air stream.
      3) The Duct Liner shall be adhered to the sheet metal with 100% coverage of adhesive and all exposed leading edges and all transverse joints coated with adhesive. Adhesive shall conform to Adhesive and Sealant Council Standards for Adhesive for Duct Liner, ASC-A-7001C-1972.
      4) The Duct Liner shall be additionally secured with mechanical fasteners (Mechanical fasteners shall conform to Mechanical Fastener Standard MF-1-1971, available from Sheet Metal and Air Conditioning Contractors National Association, which shall compress the duct liner sufficiently to hold it firmly in place.
      5) Duct Liner shall be cut to assure overlapped and compressed longitudinal corner joints.
      6) For velocities to 2,000 feet per minute, fasteners shall start within 3” of the upstream transverse edges of the Aeroflex Duct Liner and 3” from the longitudinal joints and shall be spaced at a maximum of 12” o.c. around the perimeter of the duct, except that they may be a maximum of 12” from corner break. Elsewhere they shall be a maximum of 18” o.c. except that they shall be placed not more than 6” from a longitudinal joint of the liner or 12” from a corner break.
      7) For velocities from 2,001 to 4000 feet per minute, fasteners shall start within 3” of the upstream transverse edges of the liner and 3” from the longitudinal joints and shall be spaced at a maximum of 6” o.c. around the perimeter of the duct, except that they may be a maximum of 6” from a corner break. Elsewhere they shall be a maximum of 16” o.c., except that they shall be placed not more than 6” from a longitudinal joint of the liner nor 12” from a corner break. In addition to the adhesive edge coating of transverse joints, any longitudinal joints shall be similarly coated with adhesive.
      8) For velocities from 4,000 to 6,000 feet per minute. Same as 2,001 to 4,000 FPM except that metal nosing shall be installed to secure the Aeroflex Duct Liner at all upstream transverse edges.
PART 3 EXECUTION

3.01 GENERAL

A. Insulation shall be applied to surfaces after successful testing and after items have been properly installed and cleaned. Workmanship in all cases shall represent the best quality. The finished surface of insulation materials shall be smooth, free of wrinkles, ridges, gaps, and cracks.

B. Seal all exposed insulation at ends and edges.

3.02 PIPING SYSTEMS

A. Insulate all piping systems as follows:

B. Domestic cold, hot, and re-circulating water lines shall be insulated with 1/2" thick insulation.

C. Pipe insulation at hangers shall be half or full round calcium silicate of the same thickness and jacketing as the adjoining insulation. The calcium silicate shall rest on a heavy gauge galvanized sheet metal shield and extend 2" beyond shield length each way. The shield gauge and length are as follows:

<table>
<thead>
<tr>
<th>Pipe size</th>
<th>Gauge</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; - 2-1/2&quot;</td>
<td>18</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

D. Any piping subject to freezing shall be covered with another additional layer of 2-inch fiberglass insulation of the same finish as specified for the particular service when not subject to freezing.

E. Piping which is exposed to weather or called to be electric heated/weatherproofed shall be covered - in addition to insulation and finishes specified for freezing - with corrugated aluminum jacket 0.016 inch thick applied with aluminum lock-type bands, 12-inches apart. Fittings, flanges, strainers and valves shall be coated with BF 65-07.

F. Handicapped Lavatories:

1. Insulate all water piping and the p-trap and drain line below each handicapped lavatory with 3/4" thick Armaflex or equivalent material.

G. Refrigerant Suction Piping:

2. All butt ends and longitudinal joints shall be sealed with O-C 500 adhesive as manufactured by Owens-Corning Co.

END OF SECTION 23 07 00
PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. Related Sections: Refer to Sections 22 10 00 and 23 00 00 for basic requirements for all mechanical work.

1.02 DESCRIPTION OF WORK

A. Extent of gas systems work includes connection to existing gas service, yard piping, connection to all gas fired equipment, as indicated on the drawings and requirements of this section.

B. Trenching and backfill required in conjunction with gas service piping.

1.03 QUALITY ASSURANCE

A. Installation, materials, and methods shall conform to the following codes and standards; ANSI B31.2 "FUEL GAS PIPING", NFPA 54, UPC, UMC, and in compliance with the local utility company.

PART 2 PRODUCTS

See Section 22 10 00 "Plumbing Basic Materials and Methods" for additional requirements.

2.01 MATERIALS AND PRODUCTS

A. General: Provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by manufacturer’s installation requirements. Provide materials and products complying with NFPA 54, and/or NFPA 58, where applicable and pressure rating on gas piping system maximum demand. Provide sizes and types matching piping and equipment connections; provide fittings, and material which match pipe materials

2.02 BASIC IDENTIFICATION

A. Provide identification complying with section 22 10 00 and the following.
   1. Building distribution - Plastic pipe markers
   2. Gas service - Plastic line markers underground type

2.03 BASIC PIPING AND FITTINGS

A. Provide pipe and fittings per 22 10 00 and in accordance with the following;

B. Gas service piping:
   1. Black steel schedule 40 piping to be machine wrapped using 50% overlap wrap with polyvinyl chloride tape. Hand wrap fittings using 100% overlap extending 6" beyond fitting onto wrapped pipe, comply with tape manufacture’s instructions.
   2. Pipe sizes 1/2" to 2" - thermoplastic gas pressure pipe, tubing and fittings. ASTM D 2513
   3. Pipe sizes 2" to 12" - reinforced epoxy resin gas pipe and fittings, ASTM D 2517.

C. Building Distribution:
   1. 2" and smaller - black steel pipe sch. 40 malleable iron, threaded fittings.
   2. 2 1/2" and larger - black steel, wrought steel butt weld.

2.04 BASIC PIPING SPECIALTIES

A. Provide piping specialties such as, pipe escutcheons, dielectric unions, pipe sleeves and sleeve seals.

2.05 SUPPORTS

A. Adjustable swivel pipe rings for horizontal piping hangers and supports, two bolt riser clamps for vertical piping supports, concrete inserts, c clamps and steel brackets for building attachments.

2.06 VALVES
A. Gas cocks 2" and smaller - 150 psi non shock, WOG, bronze straightway cock, threaded ends, square head. 2 1/2" and bigger 125 psi non shock, WOG, iron body, bronze mounted straightway cock, square head, flange ends

2.07 PRESSURE REGULATING VALVES

A. Provide single stage, steel jacketed, corrosion resistant gas pressure regulator, with atmospheric vent, elevation compensator, threaded ends for 2" and smaller, flanged for larger, for inlet and outlet gas pressures, specific gravity and volume flow indicated.

PART 3 EXECUTION

See Section 22 10 00 "Plumbing Basic Materials and Methods" for basic installation specifications.

3.01 INSPECTIONS

A. Examine areas and conditions under which gas systems material and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 IDENTIFICATION

A. Per section 22 10 00.

3.03 INSTALLATION

A. Install per section 22 10 00.

B. Use sealants on metal gas piping threads which are chemically resistant to gas.

C. Remove cutting and threading burrs before assembling.

D. Do not install defective piping or fittings, do not use pipe with threads that are chipped, stripped or damaged.

E. Plug each gas outlet, including valves with plug or cap immediately after installation and retain until continuing piping or equipment connections are completed.

F. Ground gas piping electrically and continuously within project.

G. Install 6" long drip leg with threaded car upstream of shut off valve at all connections to gas fired equipment, and where required by code.

H. Install tee fittings with bottom outlet plugged at bottom of risers.

I. Use dielectric unions where dissimilar metals are joined.

J. Install piping with 1/64" per foot downward slope in direction of flow.

K. Install piping parallel to other piping, but maintain 12" of clearance between gas piping and other high temperature piping.

L. For risers running through concrete or asphalt, install through minimum 6" pipe sleeve. Fill space with gravel.

M. Install magnesium anodes for each underground pipe, 5 lb. per 100'.

N. Install magnesium anode for steel pipe isolated between two sections of plastic pipe, one 3 lb. anode.

O. Gas piping exposed to weather shall receive 2 coats of asphalt paint.

3.04 GAS SERVICE

A. Arrange with Utility company to provide gas service to indicated location with shutoff at terminus. Consult with Utility as to extent of its work, costs fees, and permits involved. Pay such costs and fees to obtain permits.

B. Extend service pipe from Utility's terminus to inside building wall, under Utility's direction.

C. Provide shutoff outside building where indicated, in adjustable gas service valve box.
D. Provide shutoff in gas service at entry into building, extend pipe to gas meter location indicated. Provide parts and accessories required by Utility to connect meter.

3.05 INSTALLATION OF PIPING SPECIALTIES
A. Per section 22 10 00.

3.06 SUPPORTS AND ANCHORS
A. Provide dielectric isolation between hangars and piping or hangers and structure where dissimilar metals may come into contact.

3.07 VALVES
A. Provide gas cocks at connections to equipment, and on risers and branches.
B. Locate gas cocks where easily accessible and protected.
C. Install pressure regulating valves that comply with Utility requirements, vent to outdoors (full size vent), and install gas shutoff valve upstream of pressure reducing valve.

3.08 EQUIPMENT CONNECTIONS:
A. Connect gas piping to each gas fired equipment with drip leg, shutoff gas cock and union. Comply with manufacture’s instructions.

3.09 FIELD QUALITY CONTROL:
A. Inspect, test, and purge gas systems per Utility requirements, NFPA 54 and section 23 00 00.

3.10 ADJUSTING AND CLEANING:
A. Clean and inspect all gas systems in accordance with section 23 00 00.

3.11 SPARE PARTS:
A. Furnish to owner, with receipt, two valve wrenches for each type of gas valve installed.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. Related Sections: Refer to Sections 22 10 00 and 23 00 00 for basic requirements for all mechanical work.

1.02 DESCRIPTION OF WORK

A. Furnish and install all low pressure ductwork; louvers, diffusers, dampers, evaporative coolers, exhaust fans, O. A. Economizer valve, and vents. Furnish a complete system with materials, labor, and services to make an operable system.

PART 2 PRODUCTS

See Section 23 00 00 for Material Specifications and See Section 23 07 00 for insulation.

2.01 MATERIAL GAUGES AND CONSTRUCTION

A. Material gauges to be used in construction of ductwork shall conform to the current edition of the “Duct Manual and Sheet Metal Construction for Ventilating System”, as published by SMACNA, or ASHRAE standards.

B. All ducts, casings, plenums etc, shall be constructed of galvanized steel, unless otherwise noted. Sheets shall be free of blisters, slivers, and pits.

2.02 GRILLES AND DIFFUSERS:

A. Furnish and install all grilles and diffusers as shown and scheduled on the drawings to deliver the indicated air flow, without objectionable draft or noise.

2.03 FURNACE/UNIT HEATERS

A. Install new units as noted on drawings, UL listed, and supplied and installed as a complete operating system, with thermostat. Unit shall be designed to meet energy efficiency requirements specified in the project drawings or of the International Energy Conservation Code, whichever is more stringent, using either natural gas or propane as fuel. See drawings for complete description. Submittals to be reviewed by Architect/Engineer prior to purchase. Contractor responsible for verifying that the units will fit as shown on the contract documents.

2.04 EVAPORATIVE COOLERS

A. Install new units as noted on drawings, UL listed, and supplied and installed as a complete operating system. See drawings for complete description. Submittals to be reviewed by Architect/Engineer prior to purchase. Contractor responsible for verifying that the packaged unit will fit as shown on the contract documents. Provide equipment supports as shown on drawings.

PART 3 EXECUTION

See Section 23 00 00 for basic installation specifications.

3.01 INSTALLATION

A. All necessary allowance and provisions shall be made in the installation of sheetmetal ducts for the structural conditions of the building. Ducts shall be transformed or divided as may be required; whenever this is necessary, the equivalent area shall be maintained. All these changes must be approved prior to installation. During the installation, the open ends of all ducts shall be protected to prevent debris and dirt from entering. Installation and workmanship shall be such that the system is free from buckling, warping, breathing, noise, and vibration.
3.02 RECTANGULAR DUCTS

A. Sheetmetal ducts and fittings over 18" shall be crossbroken or otherwise stiffened to reduce oil canning and to keep vibration to a minimum. Vertical and horizontal sheetmetal barriers, duct offsets, and elbows shall be crossbroken. Crossbreaking shall be applied to the sheetmetal between the standing seams or reinforced angles.

B. All radius elbows with a rectangular cross section shall have an inside radius of not less than the width of the duct or shall be furnished with turning vanes. Vane spacing shall be 1/3 the duct width for widths up to 35". For over 35" vane spacing shall be 1/4 the duct width.

C. All elbows shall be equipped with air foil type or double thickness turning vanes pre-assembled on runners. Vanes for ducts up to 18" shall have an inside radius of 2" and an outside radius of 4".

3.03 ROUND DUCTS

A. Elbows for round ducts shall have a minimum centerline radius of 1 1/2 times the diameter of the duct and shall be constructed without splinters. Smooth or stamped elbows shall be used whenever possible. When gored elbows are used they shall be as follows; 0 to 36 degrees - 2 gores, 37 to 72 degrees - 3 gores and 73 to 90 degrees shall have 5 gores.

B. All round duct and fittings shall be spiral lockseam conduit per United Sheet Metal Company or equal. Sizes thru 8" shall be 26 gauge, 9" thru 22" shall be 24 gauge, 23" thru 36 shall be 22 gauge. All 90 degree elbows shall be at least 5 piece construction.

3.04 DUCT CAULKING

A. All ductwork joints and seams shall be sealed with Hardcast two - part sealing system, utilizing R.A.-50 adhesive and DT tape.

3.05 FLEXIBLE DUCT

A. Flexible duct shall be Thermaflex, type GKM vinyl coated, 1" fiber glass insulation and vinyl coated woven fiber glass fabric inside or approved equal. Pressure rating –1 in. to +6 in.

3.06 FLEXIBLE CONNECTIONS

A. Provide flexible connections, not less than 4" wide, constructed of fireproof and waterproof woven glass fabric, at the inlet and outlet connection of each fan unit, securely fastened to the unit and to the ductwork by galvanized band with tightening screws. Install the flexible connection so there will be no metal to metal contact.

3.07 INSTALLATION

A. Installation shall conform to local codes and ordinances, SMACNA, UMC and to NFPA 90A.

3.08 TESTS

A. Deliver to Architect/Engineer 3 copies of a typewritten report indicating the label rating, voltage, and ampere readings for all motors in the building.

B. Adjust all fan drives to deliver amount of air specified in the contract documents.

C. Balance air distribution system to air quantities shown in the contract documents.

D. Calibrate all automatic controls and adjust control settings to operate as designed.

E. Replace all disposable filters used during the construction period with new filters and clean and reinstall all cleanable filters.

F. Deliver to Architect/Engineer a certified balancing report per Section 23 05 93.

END OF SECTION 23 30 00
SECTION 23 37 00 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 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.

B. Related Sections: Refer to Sections 22 10 00 and 23 00 00 for basic requirements for all mechanical work.

1.02 SCOPE

A. Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.

B. Types of outlets and inlets required for project include the following:
   1. Ceiling air diffusers.
   2. Wall registers and grilles
   3. Louvers

C. Refer to other Sections for ductwork and duct accessories required in conjunction with air outlets and inlets; not work of this section.

D. Refer to other Division 23 05 93 for balancing of air outlets and inlets; not work of this section.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of air outlets and inlets of types and capacities required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Codes and Standards.

C. ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650 “Standard for Air Outlets and Inlets”.

D. NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A “Standard for the Installation of Air Conditioning and Ventilating Systems”.

PART 2 PRODUCTS

2.01 CEILING AIR DIFFUSERS

A. General: Except as otherwise indicated, provide manufacturer's standard ceiling air diffusers where shown, of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete system.

B. Performance: Provide ceiling air diffusers as specified in the contract documents. The equipment provided shall have, as a minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in the specified manufacturer's current data.

C. Ceiling Compatibility: Provide diffusers with border styles that are compatible with adjacent ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to construction drawings and specifications for types of ceiling systems which will contain each type of ceiling air diffuser.

D. Types: Provide ceiling diffusers of the type, capacity, and with accessories as listed on the equipment schedule.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering diffusers which may be incorporated in the work include, but are not limited to, the following:
2.02 WALL REGISTERS AND GRILLES

A. General: Except as otherwise indicated, provide manufacturer’s standard wall registers and grilles where shown, of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

B. Performance: Provide wall registers and grilles that have, as a minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in specified manufacturer's current data.

C. Ceiling Compatibility: Provide wall registers and grilles with border styles that are compatible with adjacent wall systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to construction drawings and specifications for types of wall systems which will contain each type of wall register and grille.

D. Types: Provide ceiling diffusers of type, capacity, and with accessories as listed on the equipment schedule.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering diffusers which may be incorporated in the work include, but are not limited to, the following:
   3. Tuttle & Bailey; Div. of Interpace Corp.

2.03 LOUVERS

A. General: Except as otherwise indicated, provide manufacturer’s standard louvers where shown, of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

B. Performance: Provide louvers that have, minimum free area, and maximum pressure drop of each type as listed in manufacturer's current data.

C. Substrate Compatibility: Provide louvers with frame and sill styles that are compatible with adjacent substrate systems, and that are specifically manufactured to fit into construction openings with accurate fit and support for weatherproof installation. Refer to general construction drawings and specifications for types of substrate which will contain each type of louver.

D. Louver Screens: on the inside face of exterior louvers, provide ½” square mesh anodized aluminum wire bird screens mounted in removable frames.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering louvers which may be incorporated in the work include, but are not limited to, the following:
   1. Industrial Louvers
   2. Ruskin
   3. Penn

PART 3 EXECUTION

3.01 INSPECTION

A. Examine areas and conditions under which air outlets and inlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended function.

B. Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.

C. Locate ceiling air diffusers, registers, and grilles, as indicated on construction documents and
Architectural "Reflected Ceiling Plans".

3.03 SPARE PARTS

A. Furnish to Owner, with receipt, three (3) operating keys for each type of air outlet and inlet that require them.

END OF SECTION 23 37 00 - AIR OUTLETS AND INLETS
PART 1  GENERAL

1.1  SUMMARY

A. Provide labor, materials, equipment, services, and incidentals required for complete and functioning electrical systems as required by the contract documents.

1.2  APPLICABLE PROVISIONS

A. General and Supplementary General Conditions, applicable provisions of Division 1 - General and other provisions of contract documents apply to work of the Electrical Divisions. Provisions of this section apply to every section of the Electrical Divisions, except where specifically modified. Sections of Electrical Divisions are complementary, interrelated, and mutually binding. Where electrical equipment or work is furnished as a part of equipment or systems supplied or installed under other Divisions, that electrical equipment or work shall comply with the requirements of Electrical Divisions, in their entirety. The only allowable exception to this requirement shall be when listing or labeling required under these specifications would be voided by modification or substitution of electrical equipment. Where provisions of these specifications appear to conflict with drawings or other specifications, such conflict shall be identified in writing to the Owner’s representative and clarification requested.

1.3  REFERENCE CODES AND STANDARDS

A. Standards of the following organizations may be referenced in the specification. Unless noted otherwise, references are to standards or codes current at the time of bidding.

1.  Association of Edison Illuminating Companies (AEIC).
3.  Institute of Electrical and Electronics Engineers (IEEE).
4.  Insulated Cable Engineers Association (ICEA).

1.4  REGULATIONS AND PERMITS

A. Regulations. Work, materials and equipment must comply with the latest rules and regulations of the following:

3.  Occupational Safety and Health Act (OSHA).
4.  Americans with Disabilities Act (ADA).
5.  City of Albuquerque.
6.  State and federal codes, ordinances and regulations.
7.  Serving utilities for electric power, telephone, or cable television.

B. Discrepancies. The drawings and specifications are intended to comply with listed codes, ordinances, regulations and standards. Where discrepancies occur, immediately notify the Owner's representative in writing and ask for an interpretation. Should installed materials or workmanship fail to comply, the Contractor is responsible for correcting the improper installation. Where sizes, capacities, or other such features are required in excess of minimum code or standards requirements, provide those specified or shown.

C. Permits. Obtain certificates of inspection and other permits required as a part of the work. The Contractor shall obtain timely inspections by jurisdictional authorities at such times as are required by those authorities. Costs associated with exposing work not inspected in a timely manner, or testing required by authorities to demonstrate compliance with codes or standards shall be the responsibility of the Contractor.
1.5 CONTRACT DRAWINGS

A. Intent. The intent of the drawings is to establish the types of systems and functions, but not to set forth each item essential to the functioning of the system. Electrical drawings are generally diagrammatic and show approximate location and extent of work, all details may not be shown but shall be installed to meet Codes as detailed in paragraph 1.04.B. Install the work complete, including minor details necessary to perform the function indicated. In case of doubt as to work intended, or if amplification or clarification is needed, request instructions from the Owner's representative.

B. Discrepancies. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Owner's representative for his interpretation.

C. Existing Conditions. Visit the site and ascertain the conditions to be met and the work to be accomplished in removing and modifying the existing work, and installing the new work. Failure to comply with this provision shall not constitute grounds for additional payment in connection with removing or modifying part of the existing installations and installing new or temporary work.

D. Switch, Outlet, and Equipment Locations. Coordinate the actual locations of electrical switches, outlets, lights, and equipment with building features and equipment as indicated on architectural, structural, mechanical and plumbing drawings. Review with the Owner's representative any proposed changes in switch, outlet, lights, or equipment location. Relocation of switches, outlets, or equipment before installation, of up to 10 feet from the position indicated, may be directed by the Owner's representative without additional cost. Remove and relocate outlets placed in an unsuitable location, when so requested.

E. As-Built Drawings: Provide and maintain, on the job, a complete and accurate record set of prints showing all electrical work. Keep record set up-to-date as work progresses. Upon completion of the work, furnish to the Architect-Engineer two (2) neat, legible copies of As-Built Drawings. Drawings shall be dated and signed by the Contractor.

F. Drawings and Specifications shall be considered as cooperative, and work or materials called for by one and not mentioned by the other shall be done and furnished as though treated by both. Where discrepancies occur between Plans and Specification, the most stringent shall govern.

1. In case of discrepancies in figures, drawings, or specifications, the Engineer shall be notified immediately and his decision shall determine the necessary adjustment. Without such decision, said discrepancies shall not be adjusted by the Contractor except at his expense; and, in case of any settlement or any compilation arising from such adjustment, the Contractor shall bear all extra expense involved.

2. Should it appear that the work intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the Drawings or Specifications, the Contractor shall apply to the Engineer for such further drawings or explanation as may be necessary, allowing a reasonable time for the Engineer to supply same, and the Contractor shall conform to same as part of the Contract.

3. Should any doubt or question arise in respect to the true meaning of the drawings or specifications, the question shall be posed to the Engineer, whose decision shall be final and conclusive.

4. All conduits in the finished area of the building shall be run concealed in chases, furring, suspended ceilings, etc., unless noted of directed otherwise. In unfurnished spaces and equipment rooms, all conduit lines shall be run to a continuous grade and square to the building.

5. The Contractor shall thoroughly acquaint himself with the details of the building plans and construction before submitting his bid as no allowance will be made because of the contractor’s unfamiliarity with these details or existing site conditions.

6. The Contractor shall carefully lay out his work at the site to conform to structural conditions, to avoid all obstructions, to conform to the details of installation supplied by the manufacturer of the equipment installed, and thereby to provide an integrated, satisfactory operating installation.

7. The Contractor shall confirm that the space provided for the electrical equipment is large enough for said equipment. If not, the Contractor shall immediately notify the Architect that the equipment space provided is not sufficient.

1.6 CONTRACTOR QUALIFICATIONS

A. An acceptable Contractor for the work under this division must have personnel with experience, training and skill to provide a practical working system. The Contractor may be required to furnish acceptable
evidence of having installed not less than three systems of size and type comparable to this project. The systems must have served satisfactorily for not less than 3 years. The superintendent must have had experience in installing not less than three such systems. The Contractor shall employ and utilize licensed and certified professionals and tradesmen where required by local jurisdictions.

1.7 SUBMITTALS

A. General: A proposed item that is submitted by the Contractor and "Rejected" by the Engineer shall be resubmitted by the Contractor and returned by the Engineer with a "Revise and Resubmit" note with one opportunity for a correct submittal. If the proposed item is not corrected, it will be returned with a "Rejected" note, and the Contractor will be obligated to submit and supply the item specified in the contract documents.

B. Product Listing:
1. Prepare listing of major electrical equipment and materials for the project.
2. Provide all information requested.
3. Submit this listing as a part of the submittal requirement specified in the Division 1 Section 01330 "Submittals".
4. When two or more items of same materials or equipment are required they shall be of the same manufacturer. Product manufacturer’s uniformity does not apply to raw materials, except as otherwise indicated.
5. Provide products which are compatible within systems and other connected items.

C. Shop Drawings:
1. Scope: Shop drawings and/or brochures are required for, but are not limited to, the following items: lighting, type of cable, type of switches and receptacles.
   a. Submit shop drawings as specified in Division 1. Furnish seven (7) sets of shop drawings, manufacturer's brochures and lists of materials furnished under this Division.
2. Requirements: Shop drawings and brochures shall consist of published ratings or capacity data, detailed construction drawings, wiring and control diagrams, installation instructions, manufacturer's installation drawings, and other pertinent data. Where the literature submitted covers a group or series of similar items, the item under consideration shall be clearly indicated.
3. Certification: Shop drawings shall be accompanied by certification from this Contractor that shop drawings have been checked by him for compliance with Contract Documents.
4. Definition of Approval: Approval of these submittals shall not be construed as releasing the Contractor from further responsibility. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. All material and equipment shall meet the requirements of the Specifications and the Drawings, the Architect and Engineer do not constitute a checking agent for the Contractor. All materials and equipment shall be subject to final acceptance by the Architect at the completion of construction and adjustment of the systems.

D. Operating Instructions and Service Manual: The Contractor shall carefully prepare an operating instruction and service manual for the entire system, including the all equipment. The service manuals shall be assembled in hard cover, three-ring binders. The service manual shall be submitted for approval at least thirty (30) days prior to completion of the work. Failure to submit this item will delay final inspection and acceptance of the work by the Architect-Engineer.
1. The form in which the service manual is to be presented shall be subject to the approval of the Architect-Engineer. All items in the manual shall be numbered in succession.
2. The following items, together with any other necessary pertinent data, shall be included in the manual. This is not complete and is to be used as a guide:
   a. Index to contents with item numbers.
   b. Part numbers of all replaceable items.
   c. Manufacturer’s cut sheets and rating tables, including brochures on all equipment installed.
   d. Manufacturer’s, supplier’s, and subcontractor’s names, addresses, and telephone numbers.
   e. Written guarantees.
   f. “As-Builts” corrected and completed to date.
3. After approval of the manual by the Architect-Engineer, four (4) copies of each shall be furnished to the Architect-Engineer for distribution.
4. The operating instructions and service manual shall be considered a part of the final inspection and shall be submitted for approval at least fifteen (15) days in advance of request for final
1.8 EXAMINATION OF PREMISES
A. Visit building site and ascertain existing conditions which will effect this contract, as no allowance will be made for existing conditions. The Contractor must include all cost for demolition and new work.

1.9 EXISTING SERVICES
A. The Contractor shall carefully examine the drawings and specifications, visit the site of the work, fully inform himself of all existing conditions, dimensions, and limitations before commencing the work. Contractor shall include in his price all costs associated with getting power, telephone, and cable to the project.

B. The Contractor shall determine the exact location of all existing utilities before commencing the work. He agrees to be fully informed of and responsible for any and all damages which might occur by his failure to exactly locate and preserve any and all underground utilities.

C. The Contractor shall also notify all corporations, companies, individuals, or local authorities owning or having jurisdiction over conduits, wired, piped, or other equipment which are not needed or which interfere in any manner with the execution of this contract.

1.10 INTERFERENCE
A. The Contractor shall refer to other sections of these specifications covering the work of other trades, which must be carried out in conjunction with the electrical work so that the construction operations can proceed without interference, delay, or absence of coordination.

1.11 GUARANTEE – WARRANTY
A. The Contractor shall guarantee all workmanship, materials, and equipment for one year from the date of acceptance, or one complete heating and the cooling cycle, whichever is longer. In the event defects appear during this period, the Contractor shall immediately, upon receipt of notice, make all necessary improvements at his expense.

B. Final Inspection: When the Contractor notifies the Architect-Engineer that the project is ready for final inspection, the Architect-Engineer will visit the job site and will prepare a final punch list of all items that shall be finished or corrected before the project can be accepted.

PART 2 PRODUCTS
2.1 PRODUCT OPTIONS AND SUBSTITUTIONS
A. Refer to Section 01 32 00 “SUBMITTALS” for requirements in selecting substitutions.

2.2 QUALITY OF MATERIALS
A. All equipment and materials shall be new, and shall be the standard product of manufacturer’s regularly engaged in the production of plumbing, heating, ventilation, and air conditioning and shall be the manufacturer’s latest design. Specific equipment, shown in schedules, on drawings, and specified herein, is set forth standard of quality and operation. Equal equipment shall be determined by the Architect-Engineer, and those items deemed equal shall be specifically approved by the Architect-Engineer.

2.3 ELECTRICAL MOTORS
A. All electrical motor characteristics (voltage, etc.) Must be verified prior to ordering.

B. All motors shall be built in accordance with the current applicable IEEE, ASA, and NEMA standards. All general purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations unless otherwise shown on the contract documents. All motors to have minimum power factor of 85% or have switched to corrections to 90%.

C. Unless indicated otherwise, motors shall be NEMA design B with a service factor of 1.15 with 40 deg. C. rise and total temperature rise of 65 deg. C. ambient when powered from the required voltage specified for the motor. Motors located in areas exceeding 40 deg. C. ambient shall be factory rated for the
ambient temperature of the motor environment. Single phase motors shall be NEMA type N split phase induction motors with built-in thermal protectors. Single phase motors for loads requiring high starting torque shall be capacitor start induction motors.

D. If the Contractor proposes to furnish motors varying in horse power and/or characteristics from those specified, he shall first inform the Architect-Engineer of the change and shall coordinate the change with Electrical Contractor and shall pay all additional charges in connection with the change.

E. NEC and UL. Products must conform to requirements of the National Electrical Code. Where Underwriters' Laboratories have set standards, listed products and issued labels, products used must be listed and labeled by UL.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING:

A. Deliver products properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.

C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

3.2 INSTALLATION

A. All work shall be completely installed as required by this section, the local and state ordinances and safety orders, and OSHA regulations. The workmanship shall be first class and the work shall keep up with the construction.

3.3 WORK LAYOUT

A. Conform to structural conditions and to manufacturer’s recommendations. All pipe runs shall be concealed where possible with continuous grade square to building.

3.4 FIELD MEASUREMENTS

A. The Contractor shall verify the dimensions covering the electrical work at the building. No extra compensation shall be claimed or allowed on account of difference between actual dimensions and those indicated on the Drawings. The Contractor shall examine the adjoining work on which the electrical work is dependent for maximum efficiency, and shall report any work which must be corrected. No waiver of responsibility for defective work shall be claimed or allowed due to failure to report unfavorable work conditions affecting Electrical Work.

3.5 MANUFACTURER’S DIRECTIONS

A. The Contractor shall install all equipment in strict accordance with all directions recommendations furnished by the manufacturer. Where such directions are in conflict with the plans and specifications, the Contractor shall report such conflicts to the Architect-Engineer, who shall make such compromises as he deems necessary and desirable.

3.6 DAMAGED WORK

A. Replace or repair to the Architect-Engineer’s satisfaction at the Contractor’s expense all damaged work.

3.7 CUTTING AND PATCHING

A. This Article specifies the cutting and patching of electrical equipment, components, and material to include removal and legal disposal of selected materials, components, and equipment.

B. Refer to the Division 1 Section “Cutting and Patching” for general requirements for cutting materials.

C. Refer to divisions in 15 Section: For requirements for cutting and patching mechanical equipment,
components, and materials.

D. Do not endanger or damage installed Work through procedures and processes of cutting or patching.

E. Arrange for repairs required to restore other Work, because of damages caused as a result of mechanical installations.

F. No additional compensation will be authorized for cutting and patching Work that is necessitated by ill-timed, defected, or non-conforming installations.

G. Perform cutting, fitting, and patching of electrical equipment materials required to:
   1. Uncover Work to provide for installation of ill-timed Work;
   2. Remove and replace defective Work;
   3. Remove and replace Work not conforming to requirements of the Contract Documents;
   4. Removed samples of installed Work as specified for testing;
   5. Installed equipment and materials in existing structures;
   6. Upon written instructions from the Architect-Engineer, uncover and restore Work to provide for Architect-Engineer observation of concealed Work.

H. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

I. Locate, identify, and protect mechanical and electrical services passing through remodel or demolition area and required to be maintained operational. When transit services must be interrupted, provide temporary services for the affected areas and notify the owner prior to changeover.

3.8 TEMPORARY UTILITIES

A. The Contractor shall provide utilities required for the proper execution and protection of the Work as follows:
   1. All temporary light and power complete with all wiring, lamps, and similar equipment, as required for completion of the Work.
   2. Temporary heating by suitable means to provide protection to the Work, comfort to the workers where necessary required, for making any necessary tests, and to dry materials when necessary to prevent delay in Work.
   3. The cost of services used (gas, water, and electricity) shall be borne by the Contractor.
   4. The Contractor shall arrange for and pay for all connections to existing services and for supplies, materials, etc., required to provide these utilities.

3.9 UNKNOWN UTILITIES AND OBSTACLES

A. If any unknown and un-chartered utilities are encountered during excavation, promptly notify the Architect-Engineer and wait for his instruction before proceeding.

B. If it is ascertained by the Architect-Engineer that such utility line is abandoned, the Contractor shall properly cap the line at a depth of 12” or more below the finish grade.

C. Condition. Provide new products of manufacturers regularly engaged in production of such equipment. Provide the manufacturer's latest standard design for the type of product specified.

D. NEC and UL. Products must conform to requirements of the National Electrical Code. Where Underwriters' Laboratories have set standards, listed products and issued labels, products used must be listed and labeled by UL.

E. Space Limitations. Equipment selected must conform to the building features and must be coordinated with them. Do not provide equipment, which will not suit arrangement and space limitations. Where equipment is described by manufacturer's designations, yet alternate manufacturers are designated in the contract drawings as acceptable suppliers, spatial considerations will bear equally with performance criteria in determining the acceptability of alternate equipment.

F. Factory Finish. Equipment must be delivered with a hard surface, factory-applied finish so that no additional field painting is required except for touch-up as required.
3.10 PROTECTION OF EQUIPMENT

A. **Moisture.** During construction, protect switchgear, transformers, motors, control equipment, and other items from insulation moisture absorption and metallic component corrosion by appropriate use of strip heaters, lamps or other suitable means. Apply protection immediately on receiving the products and maintain continually.

B. **Clean.** Keep products clean by elevating above ground or floor and by using suitable coverings.

C. **Damage.** Take such precautions as are necessary to protect apparatus and materials from damage. Failure to protect materials is sufficient cause for rejection of the apparatus or material in question.

D. **Finish.** Protect factory finish from damage during construction operations and until acceptance of the project. Satisfactorily restore any finishes that become stained or damaged.

3.11 INSTALLATION

A. **Cooperation with Other Trades.** Cooperation with trades of adjacent, related or affected materials or operations, and of trades performing continuations of this work under subsequent contracts, is considered a part of this work in order to effect timely and accurate placing of work and to bring together, in proper and correct sequence, the work of such trades.

B. **Workmanship.** Work must be performed by workmen skilled in their trade. The installation must be complete.

C. **Concrete Equipment Pads.** Install 4" thick concrete housekeeping pads for indoor floor-mounted unless direct floor mounting is recommended by the equipment manufacturer or directed on the Drawings. Pour pads on roughened floor slabs and size slabs to extend a minimum of 6" beyond all edges of the equipment. Where several pieces of equipment are grouped, a single pad shall be poured for the group. Trowel pads smooth and chamfer edges to a 1" bevel. Edges shall be dressed smooth to eliminate sharp or irregular surfaces. Secure the equipment to the pad as recommended by the equipment manufacturer.

D. **Setting of Equipment.** Equipment must be leveled and set plumb. Sheet metal enclosures mounted against a wall must be separated from the wall not less than 1/4 inch by means of corrosion-resistant spacers or by 3 inches of air for freestanding units. Use corrosion-resistant bolts, nuts and washers to anchor equipment. In sufficient time to be coordinated with work under other divisions, provide drawings and layout work showing exact size and location of sleeves, openings or inserts for electrical equipment in slabs, walls, partitions and chases.

E. **Sealing of Equipment.** Seal openings into equipment to prevent entrance of animals, birds and insects.

F. **Motors and Equipment.** Motors are specified under other sections of Division 16, but are provided as a part of the associated driven equipment. Electrical work includes the electrical connection of all motors, except those which are wired prior to delivery as a part of equipment. Electrical work also includes the mounting and connection of loose motor starters, disconnects, controls, and alarms furnished with equipment provided under other parts of this contract. Provide, install, and adjust motor overload protective elements sized in accordance with the National Electrical Code and based on the rated motor full load current indicated on each motor nameplate.

G. **Concealed Work.** Conceal electrical work in walls, floors, chases, under floors, underground and above ceilings except where shown or specified to be exposed. Exposed is understood to mean open to view. Where exposure is necessary to the proper function. Where size of materials and equipment preclude concealment. Where conduit is shown concealed below the surface of the floor, conduit must be installed below the floor slab unless written approval has been obtained from the Structural Engineer of Record to allow installation within the concrete slab.

H. **Demolition.**
   1. Unless otherwise noted, remove electrical materials and equipment from areas indicated for demolition.
   2. Remove unused conduit to the extent necessary to accommodate new work and where conduit is visible above the floor line. Seal abandoned conduits that remain in place behind walls or in floor slabs. Remove wiring from abandoned conduit.
   3. Materials and equipment to be removed, except items specifically listed to be relocated or delivered to the Owner, become the property of the Contractor and must be immediately
removed from the project site.

4. Electrical services and controls to items being removed must be disconnected and removed completely to their source of service as a requirement of this section. Where services are removed to a disconnecting means, label the disconnecting means "Spare".

5. Removal of equipment must not interfere with existing operations.

3.12 ELECTRICAL SERVICE

A. Temporary Service. Provide temporary service sufficient to allow testing of refrigeration equipment, pumps, fans, elevators, and other equipment furnished under other divisions of the Contract Documents. Temporary service shall be available no later than thirty (30) days prior to scheduled substantial completion.

B. Permanent Service. Coordinate with the Owner's representative and electric utility to establish permanent service no later than seven (7) days prior to scheduled substantial completion. The Contractor shall make such provisions as are required by the utility to establish permanent service. Such provisions may include, but are not limited to, mounting of utility-furnished metering equipment, construction of transformer or switchgear pads or vaults in accordance with utility requirements, installation of grounding, or provision of raceways. Delays in obtaining permanent electrical service caused by the Contractor's failure to identify and comply with utility service criteria shall not be cause for increased costs to the Owner nor extension of the Contractor's contractual duration.

3.13 TELEPHONE SERVICE

A. Permanent Service. Coordinate with the Owner's representative and telephone utility to establish permanent service no later than seven (7) days prior to scheduled substantial completion. The Contractor shall make such provisions as are required by the utility to establish permanent service. Such provisions may include, but are not limited to, mounting of utility-furnished equipment, installation of grounding, or provision of raceways. Delays in obtaining permanent telephone service caused by the Contractor's failure to identify and comply with utility service criteria shall not be cause for increased costs to the Owner nor extension of the Contractor's contractual duration.

3.14 CABLE TELEVISION SERVICE

A. Permanent Service. Coordinate with the Owner's representative and cable television utility to provide conduit from the point of service to each unit. Make such provisions as are required by the utility to establish this connection. Delays in obtaining the conduit run caused by the Contractor's failure to identify and comply with utility service criteria shall not be cause for increased costs to the Owner nor extension of the Contractor's contractual duration.

3.15 TESTING

A. Test Conditions. Place circuits and equipment into service under normal conditions, collectively and separately, as may be necessary to determine satisfactory operation. Perform specified tests in the presence of the Owner's representative. Furnish all instruments, wiring, equipment and personnel required for conducting tests. Demonstrate that the equipment operates in accordance with requirements of the drawings and specifications. Special tests on certain items are specified hereinafter. Where specified that the testing be performed by an independent testing company, an Owner approved NETA certified testing company shall be used.

B. Test Dates. Schedule final acceptance tests sufficiently in advance of the contract date to permit completion of any necessary adjustment or alterations within the number of days allotted for completion of the contract.

C. Retests. Conduct retests as directed by the Owner's representative of such time duration as may be necessary to assure proper functioning of adjusted or altered parts or items of equipment. Resultant delays as a result of such necessary retests do not relieve the Contractor of his responsibility under this contract.

END OF SECTION 260500
SECTION 26 05 13 - WIRE AND CABLE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire

1.02 SYSTEM

A. Furnish wire and cable for all systems except where supplied as part of a system or piece of equipment, where stated otherwise in the specifications or drawings.

1.03 SUBMITTALS

A. Submit this listing as a part of the submittal requirement specified in Section 26 05 00.

PART 2 PRODUCTS

2.01 600V POWER AND GENERAL PURPOSE WIRE

A. Products shall meet NEC 310, UL 83, and the ANSI C8 Series.

B. Conductor shall be copper.

C. NEC Type shall be THWN/THHN.

D. The minimum wire size wire shall be as follows unless otherwise stated on the drawings: 480 V #10; 120/240/240V #12; control #14, stranded; grounding/bonding #12.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all wiring in conduit, unless stated otherwise on the drawings.

B. Bending radii shall not be less than permitted by ICEA or as recommended by the cable manufacturer, whichever is greater.

C. Splicing is permissible in boxes, enclosures, handholes, or similar accessible devices. Provide boxes, enclosures, etc. as necessary for the construction of the system even if not detailed on drawings. No splicing in conduit bodies allowed.

D. Ground instrumentation cable shields at the PLC Cabinet.

END OF SECTION 26 05 13
PART 1 GENERAL

1.01 SECTION REQUIREMENTS

A. Summary: Building wires and cables and associated splices, connectors, and terminations for wiring systems rated 600 V and less, and twisted-pair cable; and raceways and boxes. Furnish wire and cable for all systems except where supplies as part of the equipment or where specified elsewhere.

PART 2 PRODUCTS

2.01 WIRES AND CABLES

A. Building Wires and Cables: Type XHWN/THWN copper conductor.

B. Connectors and Splices: Wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated.

C. Single Conductor Plenum Coaxial: 75-ohm characteristic impedance, solid bare copper central conductor, foamed Teflon dielectric, 100 percent coverage tinned-copper, double-braid shield, Teflon jacket, suitable for installation in air-handling spaces.

D. Twisted Pair: No. 22 AWG tinned-copper conductors; PVC insulation; overall aluminum/polyester shield and No. 22 AWG tinned-copper drain wire; PVC jacket.

E. Twisted-Pair Plenum: No. 24 AWG, 7-strand, tinned-copper conductors; Teflon insulation; overall aluminum/polyester shield and No. 22 AWG tinned-copper drain wire; Teflon jacket; suitable for use in air-handling spaces.

2.02 RACEWAYS

A. Conduit: Comply with the following:
   1. Rigid Steel Conduit: ANSI C80.1.
   2. Intermediate Metal Conduit: ANSI C80.6.
   3. Electrical metallic Tubing: ANSI C80.3.

B. Wireways: Hinged type, with manufacturers standard finish.

C. Surface Metal Raceway: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating suitable for painting.

D. Surface Nonmetallic Raceway: 2-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color.

E. Outlet and Device Boxes: UL listed and labeled.

F. Floor Boxes: Cast metal, fully adjustable, rectangular, size as shown on the drawings or as necessary for the installation intended.

G. Pull and Junction Boxes, UL listed and labeled.

2.03 ENCLOSURES/BOXES

A. Hinged-Cover Enclosures: NEMA 250, steel enclosure with continuous hinge cover and flush latch. Finish inside and out with manufacturer's standard enamel.

B. Cabinets: NEMA 250, Type 1, except where another Type is indicated.

C. Boxes located outdoors shall be NEMA 3R, galvanized steel, or polyester powder finish inside and out over phosphatized surfaces similar to Hoffman Bulletin A90 Screw Cover Type 3R or approved equal.

D. Boxes located indoors shall be NEMA 1, painted or galvanized steel with flat removable cover with screw similar to Hoffman Bulletin A90 Screw Cover Pull Boxes or approved equal.

PART 3 EXECUTION
3.01 INSTALLATION

A. Install wires and cables according to the NECA's "Standard of Installation."

B. Remove existing wire from raceway before pulling in new wire and cable.

C. Wiring at Outlets: Install with at least 12 inches of slack conductor at each outlet.

D. Outdoors Wiring Methods: As follows:
   1. Exposed: Rigid or intermediate metal conduit.
   2. Concealed: Rigid or intermediate metal conduit.

E. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid or Motor-Driven Equipment): Liquidtight flexible metal conduit.

F. Indoors Wiring Methods: As follows: Connection to Vibrating Equipment: Liquidtight flexible metal conduit.

G. Pneumatic, Electric Solenoid or Motor-Driven Equipment: Flexible metal conduit, except in wet or damp locations use liquidtight flexible metal conduit. Use armored cable and nonmetallic sheathed cable in applications allowed by NEC.

3.02 Raceway Installation.

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.

B. Conceal conduit and electrical metallic tubing, unless otherwise indicated, within finished walls, ceilings, and floors.

C. Use raceway fittings compatible with raceway and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.

D. Raceways Embedded in Slabs: Install in middle third of the slab thickness where practical, and leave at least 1-inch (25-mm) concrete cover.

E. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.

F. Join raceways with fittings designed and approved for the purpose and make joints tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight. Use insulating bushings to protect conductors.

G. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-lb (90-kg) tensile strength. Leave not less than 12 inches (300 mm) of slack at each end of the pull wire.

H. Install raceway sealing fittings and locate at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings where required by the NEC.

I. Stub-up Connections: Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches (150 mm) above the floor.

J. Flexible Connections: Use maximum of 72 inches (1800 mm) of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.

K. Install a separate green ground conductor in surface metal raceway from the junction box supplying the raceway to receptacle or fixture ground terminals.

END OF SECTION 26 10 00 - WIRING METHODS
SECTION 26 11 10 - CONDUIT

PART 1 GENERAL

1.01 CONDUIT
   A. Conduit
   B. Connections
   C. Adapters
   D. Fittings
   E. Clamps
   F. Hangers

1.02 SUBMITTALS
   A. Submit manufacturer’s standard literature for PVC, RMC, EMT.

PART 2 PRODUCTS

2.01 INTERMEDIATE METAL CONDUIT (IMC)
   A. Must meet NEC 345, and UL 1242.

2.02 RIGID METAL CONDUIT (RMC)
   A. Steel RMC shall meet NEC 346, UL 6, and ANSI C80.1. Electrogalvanized on outside, inside, and on threads.
   B. Aluminum RMC shall meet NEC 346, UL 6, and ANSI C80.5.

2.03 RIGID NONMETALLIC CONDUIT (RNMC)
   A. Rigid nonmetallic conduit shall meet NEC 347, UL 651, and NEMA TC2 for EPC-40.
   B. Shall be UL listed for use with 90 degrees C. conductors.
   C. Shall be ultraviolet resistant. Schedule 40 polyvinyl chloride except schedule 80 when called out on the drawings, schedules.
   D. All joints shall be glued except where there is a requirement for bell and spigot expansion joints with O rings. Provide glue to threaded fittings for transitions to thread conduit systems. Fittings and cement shall be per manufacturer’s recommendations.
   E. Product shall be Carlon Plus 40, Plus 80 or approved equal.

2.04 ELECTRICAL METALLIC TUBING (EMT)
   A. Shall meet NEC 348 and UL 797.

2.05 FLEXIBLE METAL TUBING (FMT)
   A. Shall meet NEC 349.

2.06 FLEXIBLE METAL CONDUIT
   A. Shall meet the requirements of NEC 350 and UL 1, and can be aluminum or steel.

2.07 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC)
   A. Must conform to NEC 351 (A) and UL 360.
   B. Shall have a sunlight resistant PVC jacket.
   C. Must be approved for use in temperatures form –10 degrees C. to + 60 degrees C

2.08 OTHER CONDUITS
A. All other conduits shall meet the requirements of appropriate NEC article and applicable UL standard and shall be used only after approval of Architect.

2.09 COUPLINGS
A. EMT couplings shall be steel, concrete-tight and rain-tight compression type. Set screw or indenter type not acceptable.
B. FMT, FMC, LFMC, LFNC, and XPFC not acceptable.
C. Other conduits as required by NEC or as recommended by manufacturer.

2.10 CONNECTORS
A. EMT shall be steel, concrete-tight and rain-tight compression type. Set screw or indenter type not acceptable.
B. FMT, FMC shall be steel squeeze type. Appleton catalog number 7480 through 7490 or approved equal.
C. LFMC shall be Appleton ASTM series or approved equal.
D. Other conduit as recommended by manufacturer.

PART 3 EXECUTION
3.01 DRAWINGS
A. The conduit runs are not detailed on the drawings. Install as implied by the panel schedules, one-line diagrams, and as required for the complete system.

3.02 INSTALLATION
A. For conduit bends in all but EMT and in IMC less than 1 inch shall be factory made or made with a conduit bending machine recommended by conduit manufacturer. Handmade bends are not acceptable.
B. Make bends in EMT or in 1 inch ¾ inch IMC with a hand ender, which fully supports the side wall.
C. Wrench tighten all threaded joints, couplings, and connectors.
D. Wrench tighten all fittings.
E. Run conduit concealed in finish areas and where indicated on the drawings. In many places, such as at motor and surface-mounted wiring devices in pump rooms and electrical rooms, the end of a run may be an exposed vertical riser even though the symbol used for the conduit denotes concealed.
F. Run exposed either parallel with or perpendicular to structural members of the building or structural except where allowed to otherwise by the engineer.
G. The only conduit that maybe run on the roof is conduit that serves equipment on that roof. Locate roof penetrations so no horizontal run of conduit are required on the roof.
H. Conduit installed above lay-in ceiling will be considered to be concealed, and need not comply with requirements for exposed conduit. Route to avoid interference with piping, ductwork, and luminaries. Locate conduit well above the lay-in ceiling.
I. Do not install conduit on slabs, decks, sidewalks or floors where it may create a trip hazard. The Engineer or Owner are judges on what conditions are a "trip hazard". Conduits may be installed on slabs only with written permission from the Engineer or Owner.
J. Expansion joints: where conduit spans building expansion joints or in long duct runs, use expansion fittings and bonding jumpers.
K. Drainage: avoid pockets in conduit runs. Provide suitable drainage fittings in low spots in exposed conduit. Weep holes not permitted.
L. Field cuts and threads:
   1. Cut ends of conduit square with hand or power saw and ream to remove burrs and sharp edges. Do
not use wheel cutter.
2. Threads cut on job shall have same effective length, thread dimensions, and taper as factory cut threads.
3. Carefully remove burrs from threads and paint conduit threads with 1 coat of zinc rich spray primer. Rust-Oleum Model 2185 or similar.

M. Supports:
1. Hangers, supports, or fastenings: provide at each elbow and at end of every straight run terminating in box or cabinet. Rigid fastenings spaced maximum of 7 foot horizontal, 8 feet vertical; adjustable supports spaced maximum of 7 feet.
2. Clamps: comply with manufactures’ recommendations.
3. One-hole straps are to be installed with hole below conduit in horizontal runs.
4. Trapeze hangers:
   a. Use to support horizontal runs only.
   b. Install U-bolts at end of each run and at each elbow. Install clamps every third intermediate hanger for each conduit. Hangers are not detailed but must be adequate to support combined weight of conduit, conductors, and hangers.
   c. Material: aluminum unistrut with stainless steel fittings, or Robroy Rob-Glass fiberglass strut support system.

N. Conduit ends:
1. Cap spare conduit.
2. Open conduit ends terminating in trenches, panels or enclosures: plug space around cable with commercial duct-sealing compound.
3. Cap conduit ends during construction to prevent entrance of foreign material.
4. Install grounding bushing or conduit terminations. Bond grounding bushing to ground conductor included in conduit run.

O. Cleaning: Clean and swab inside by mechanical means to remove foreign materials and moisture before wires or cables are installed.

3.03 APPLICATION

A. IMC:
1. Not permitted underground, direct buried.
2. Use only where shown on drawings.

B. RMC
1. Not permitted underground, direct buried.
2. On aluminum handrails, use aluminum RMC supported by aluminum or stainless steel hardware.
3. Aluminum RMC:
   a. Not permitted in contact with earth.
   b. Not permitted in contact with concrete.

C. RNMC:
1. Do not use where exposed to direct sunlight, except where specifically called for on the Drawings.
2. Underground, in concrete encased duct banks.
4. Where shown on drawings.
5. Do not use RNMC elbows for underground installations with conduit sizes 2 inches or greater.

D. EMT:
1. In hollow walls and in hollow ceiling spaces of finished locations for conductors of lighting and receptacle circuits.
2. Exposed in equipment rooms, shops, and similar areas where other types of conduit are not called for on the drawings.
3. Where called for on the drawings.

E. FMT
1. For the final connection to luminaries in lay-in ceilings in lengths not exceeding six feet.
2. For connection to adjustable equipment and devices in ducts or plenums in lengths not exceeding four feet.
3. As a factory supplied component of luminaries.
4. Where called for on the drawings.

F. FMC
1. For the final connection to luminaries in lay-in ceilings.
2. For the final connection to industrial type luminaries.
3. For connections to adjustable equipment and devices in ducts or plenums.
4. For final connection to motors, dry type transformers, HVAC equipment, water heaters, unit heaters, and similar applications.
5. As a factory supplied component of equipment or luminaries.
6. Where called for on the drawings.

G. LFMC
1. For the final connection to luminaries in damp or wet areas.
2. For final connection to motors, dry type transformers, HVAC equipment, water heaters, unit heaters, and similar applications in damp or wet areas.
3. As a factory supplied component of equipment or luminaries installed in damp or wet areas.
4. Where called for on the drawings.

H. OTHER CONDUITS: Where called for on the drawings.

3.04 SIZE

A. The Drawings show the minimum size required for certain conduit runs. Where size is not shown, than comply with 3.04C

B. If a conduit size has to be increased because a motor or other equipment furnished by the Contractor requires more power (and therefore larger wire and conduit than shown) than the specified motor or equipment, than the larger conduit shall be installed at no additional cost to the Owner.

C. Minimum size requirements:
1. As required by NEC, but larger if so shown on the Drawings or required below.
2. Lighting circuits except circuits to HID pole lights: ½ inch.
3. HID pole lighting circuits: 1 inch.
4. 120/208/240V receptacle circuits:
   a. Last receptacle in runs: 1/2 inch
   b. Other runs: 1/2 inch.
   c. Or as detailed on drawings.
5. 120/208/240V individual branch circuits: ½ inch.
6. 208/240V feeders: 1 inch.
7. 480V circuits: 1 inch.
8. 120VAC control circuits: ½ inch minimum; ¾ inch for to twenty(20) #14 AWG; 1 inch minimum for more than twenty(20) #14 AWG, then by NEC.
9. Shielded or coaxial cable: ¾ inch.
10. Circuits of special systems: As shown on Drawings or as required in the specification section for the respective system.
11. Other circuits: 1 inch.

END OF SECTION 26 11 10
PART 1 GENERAL

1.01 SYSTEM DESCRIPTION
   A. Coordinate upgrade or new service with local utility company.
   B. Include in the BID cost associated with service upgrade or securing new service.
   C. Pay all monthly electrical charges while the facility is under construction. Coordinate electrical charges with the Owner.
   D. Arrange with local utility and provide any necessary poles, meters, etc., for PERMANENT power.

1.02 TEMPORARY POWER
   A. If any additional temporary electrical power is needed the Contractor shall provide at this own expense.
   B. Arrange with local utility and provide any necessary poles, meters, etc., for temporary power.
   C. After the completion of construction remove any temporary power facilities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 26 21 00
PART 1  GENERAL

1.01  SUMMARY

A. This Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

1.02  SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.
   1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
      a. Enclosure types and details for types other than NEMA 250, Type 1.
      b. Bus configuration, current, and voltage ratings.
      c. Short-circuit current rating of panelboards and overcurrent protective devices.
      d. UL listing for series rating of installed devices.
      e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
   2. Wiring Diagrams: Power, signal, and control wiring.
   3. Field quality-control test reports.
   4. Operation and maintenance data.

1.03  QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

PART 2  PRODUCTS

2.01  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:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
   1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
      a. Eaton Corporation; Cutler-Hammer Products.
      c. Siemens Energy & Automation, Inc.
      d. Square D.
2.02 MANUFACTURED UNITS

A. Enclosures: Flush cabinets, coordinate depth with wall depth to ensure panel will fit in wall as detailed on Architectural Drawings. NEMA PB 1, Type 1. The Architect must approve surface mounted cabinets before construction, otherwise Contractor will be responsible for cost to remove and replace with flush cabinets.
   1. Rated for environmental conditions at installed location.
      a. Outdoor Locations: NEMA 250, Type 3R.
      c. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
      d. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.
   2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
   3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

B. Phase and Ground Buses: Hard-drawn copper, 98 percent conductivity or Tin-plated aluminum.

C. Conductor Connectors: Suitable for use with conductor material.
   1. Ground Lugs and Bus Configured Terminators: Compression type.

D. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.

E. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

F. Panelboard Short-Circuit Rating:
   1. UL label indicating series-connected rating with integral or remote upstream overcurrent protective devices. Include size and type of upstream device allowable, branch devices allowable, and UL series-connected short-circuit rating.
   2. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.03 DISTRIBUTION PANELBOARDS

A. Doors: Secured with vault-type latch with tumbler lock; keyed alike. Omit for fused-switch panelboards.

B. Main Overcurrent Protective Devices: Circuit breaker or Fused switch.

C. Branch Overcurrent Protective Devices:
   1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in or Bolt-on circuit breakers as shown on drawings.
   2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
   3. Fused switches.

2.04 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Plug-in or Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
2.05 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: UL 489, with interrupting capacity to meet available fault currents.
   1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and
      instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-
      breaker frame sizes 250 A and larger.
   2. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
   3. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and
      number of poles.
      a. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
      b. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting
         loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
      c. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated
         voltage.

B. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

C. Fuses, Service Entrance: Class RK1, fast acting, size, capacity as shown an the drawings.

2.06 CONTROLLERS

A. Motor Controllers: NEMA ICS 2, Class A, combination controller equipped for panelboard mounting and
   including the following accessories:
   1. Individual control-power transformers.
   2. Fuses for control-power transformers.
   3. Bimetallic-element or Melting-alloy overload relay.
   4. Indicating lights.
   5. Seal-in contact.
   6. Convertible auxiliary contacts as shown on drawings.
   7. Push buttons.
   8. Selector switches.

B. Contactors: NEMA ICS 2, Class A, combination controller equipped for panelboard mounting and
   including the following accessories:
   1. Individual control-power transformers.
   2. Fuses for control-power transformers.
   3. Indicating lights.
   4. Seal-in contact.
   5. Convertible auxiliary contacts as shown on drawings.
   7. Selector switches.

C. Controller Disconnect Switches: Fused switch or Adjustable instantaneous-trip circuit breaker
   interlocked with controller.
   1. Auxiliary Contacts: Integral with disconnect switches to de-energize external control-power source.

D. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held general-purpose controller.
   1. Control-Power Source: Control-power transformer, with fused primary and secondary terminals,
      connected to main bus ahead of contactor connection.
   2. Control-Power Source: 120-V branch circuit.

PART 3 EXECUTION
3.01 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Comply with mounting and anchoring requirements specified by the Manufacturer.

C. Mount top of trim 74 inches above finished floor, unless otherwise indicated.

D. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish. Coordinate depth with wall thickness as shown on Architectural drawings.

E. Install overcurrent protective devices and controllers.

1. Set field-adjustable switches and circuit-breaker trip ranges.

F. Install filler plates in unused spaces.

G. Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits into raised floor space or below slab not on grade.

H. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods."

I. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

J. Ground equipment according to drawings and NEC.

K. Connect wiring according to Division 26 10 00, "Wiring Methods."

3.02 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

B. Perform the following field tests and inspections and prepare test reports:

3. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

1. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

END OF SECTION 26 24 16 - PANELBOARDS
PART 1  GENERAL

1.01  SECTION REQUIREMENTS

A.  Submit Product Data.

PART 2  PRODUCTS

2.01  DEVICES


B.  Receptacles:  UL 498, heavy-duty grade except as indicated otherwise or NEMA 5-20R, back and side wiring feature, positive clamping with screw activated pressure plate.  Hubbell CR5262 series, Leviton BR15 series or approved equal.

C.  Ground-Fault Circuit Interrupter Receptacles:  UL 943, feed-through type, with integral NEMA 5-20R duplex receptacle; for installation in a 2-3/4-inch deep outlet box without an adapter.  Side wired, flush polycarbonate face, trip level 4 to 6 mA, trip time .025 seconds nominal, Hubbell GF5252A, Leviton 6599 series or approved equal.

D.  Snap Switches:  Quiet-type ac switches, 120/277 V, 20 A, complying with UL 20.  Back and side wiring positive clamping with screw activated pressure plate, motor switching rated 1 ½ horsepower at 120 VAC, 2 horsepower at 240 VAC.  Hubbell HBl 1221, HBL 1222, HBL 1223, HBL 1224 series, Leviton 1221-2, 1222-2, 1223-2, 1224-2 series or approved equal.

E.  Incandescent Lamp Dimmers:  Modular, 120 V, 60 Hz with continuously adjustable slide, single-pole with soft tap or other quiet switch.

F.  Fluorescent Lamp Dimmers:  Modular, compatible with dimmer ballasts and capable of consistent dimming to a maximum of 10 percent of full brightness.  Include trim potentiometer.

G.  Wall Plates, Finished Areas:  as per Architectural drawings, fastened with metal screws having heads matching plate color.  Wall plates shall be polycarbonate or nylon, premium grade, Hubbell PJ series or approved equal.

H.  Wall Plates, Unfinished Areas:  Galvanized steel with metal screws.

1.  Floor Service Fittings:  Modular, above-floor, dual-service units suitable for wiring method used.


PART 3  EXECUTION

3.01  INSTALLATION

A.  Install devices and assemblies plumb and secure and at the correct height to meet ADA requirements.

B.  Mount devices flush, with long dimension vertical, and grounding terminal of receptacles on top.  Group adjacent switches under single, multigang wall plates.

C.  Protect devices and assemblies during painting.

D.  Mount toggle switches at 42 inches above FF, receptacles at 18 inches above FF unless otherwise shown on the drawings.  Receptacles mount U ground down.

E.  Install wall plates when painting is complete.

END OF SECTION 26 27 26
PART 1 GENERAL (Not Applicable)

PART 2 PRODUCTS

2.01 SWITCHES

A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle.

B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in closed position.

2.02 CIRCUIT BREAKERS

A. Enclosed, Molded-Case Circuit Breaker: NEMA AB 1, with lockable handle.

B. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated and interrupting rating to meet available fault current.

C. Circuit Breakers, 200 A and Larger: Trip units interchangeable within frame size.


E. Current-Limiting Trips: Where indicated, let-through ratings less than NEMA FU 1, Class RK-5.

F. Enclosure: NEMA AB 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.

PART 3 EXECUTION

3.01 TESTING

A. Perform visual and mechanical inspections and electrical tests stated in NETA ATS.

END OF SECTION 26 28 16
PART 1 GENERAL

1.01 SECTION REQUIREMENTS

A. Submit Product Data for each luminaire, including lamps.

B. Coordinate ceiling-mounted luminaires with ceiling construction. Verify that luminaries scheduled will fit in space available and are the correct type for the ceiling shown in Architectural drawings.

PART 2 PRODUCTS

2.01 LUMINAIRES

A. Fixture Type, see fixture schedule on drawings.

B. Voltage, see fixture schedule on drawings.

C. Mounting, see fixture schedule on drawings and Architectural drawings.

D. Nominal Dimensions, per Manufacturer’s cut sheets.

E. Lamps, see fixture schedule on drawings.

F. Ballast Types and Features, see fixture schedule on drawings.

G. Lens, see fixture schedule on drawings.

H. External Finish, see fixture schedule on drawings

PART 3 EXECUTION

3.01 INSTALLATION

A. Set units plumb, square, and level with ceiling and walls, and secure.

B. Support for Recessed and Semirecessed Grid-Type Fluorescent Fixtures: Install ceiling support system rods or wires at a minimum of 4 rods or wires for each fixture, located not more than 6 inches from fixture corners.

C. Support for Suspended Fixtures: Brace pendants and rods over 48 inches long to limit swinging. Support stem-mounted, single-unit, suspended fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.

D. Air-Handling Fixtures: Install with dampers closed.

E. Lamping: Where specific lamp designations are not indicated, lamp units according to manufacturer’s written instructions.
 SECTION 32 31 00 Fences and Gates

A. PART 1 GENERAL
1. RELATED DOCUMENTS
   a) Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
2. Section Includes
   a) Fence framework pickets and accessories.
   b) Excavation for post bases.
   c) Concrete anchorage for posts.
   d) Manual gates and related hardware.
3. Submittals
   a) Submit per Section 01 33 00 - Submittals.
   b) Shop drawings showing locations, dimensions and styles.

B. PART 2 PRODUCTS
1. Materials
   a) Posts: ASTM A120; standard weight, one piece without joints; galvanized finish.
2. Concrete Mix
3. Components
   a) Line Posts: 1 ½” square light gauge steel.
   b) Corner and Terminal Posts: light gauge steel.
   c) Rails: 1 ½” square light gauge steel.
   d) Sheathing: 22 gauge galvanized perforated metal with large round holes ¾” diameter.
   e) Galvanized U-metal edging.
   f) Gates: 1 ½” square tube steel with 1 ½” x 4” tube steel jamb at handle.
   g) Gates Sheathing: 22 gauge galvanized perforated metal with large round holes ¾” diameter.
   h) Concrete: ASTM C94; normal Portland Cement; 2500 psi at 28-days; 3-inch slump; 3/4-inch maximum sized aggregate.
4. Finishes
   a) Galvanized: ANSI/ASTM A123; 1.8 oz./s.f. coating.
   b) Accessories: Same finish as framing.

C. PART 3 EXECUTION
1. Installation
   a) Provide fence 8’ or 10’ nominal height.
   b) Space line posts at intervals as indicated on Drawings.
   c) Set terminal, gate and line posts plumb, in concrete footings with top of footing 2-inches above and 6-inches below finish grade. Slope top of concrete for water runoff.
   d) Footing depth below finish grade: 36-inches. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads.
   e) Provide three (3) rails (four (4) rails on fences over 6-feet in height).
   f) Attach rails to posts with per-manufactured, radiused, steel devices. Use minimum two (2) lag bolts per device.

END OF SECTION 32 31 00 Fences and Gates
PART 1 GENERAL

RELATED DOCUMENTS
A) Provisions established within the General and Supplementary General Conditions of the Contract. 1 - General Requirements, and the Drawings are collectively applicable to this Section.
B) Contractor will provide up to $50,000 for design and installation of landscaping and irrigation system.

SECTION I: GENERAL CONDITIONS
A) Permits and License:
(1) The Contractor shall, at his own expense, procure all permits, certificates, and licenses required of him by law for the execution of his work. He shall also comply with all state, county, or local laws, ordinances, rules or regulations relating to the performance of his work.
B) Responsibility:
(1) 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. If any of the work is damaged or destroyed from any cause, the Contractor shall replace it at his own expense. The Subcontractor must indemnify and save harmless the Owner, General Contractor, or Construction Manager, against any claims filed for non-payment of his bills for Subcontractors, labor, and materials used in connection with the contract work.
(2) The Subcontractor shall fully coordinate his work with the General Contractor and the Owner's representative.
C) Removal of Defective and Unauthorized Work:
(1) All work which has been rejected for non-compliance to plans and specification shall be remedied or removed and replaced in an acceptable manner by the Contractor at his own expense. No compensation shall be allowed for such removal or replacement.
D) Guarantee of Work:
(1) The Contractor shall guarantee all work against defective material and workmanship for a period of one (1) year from the date of the final acceptance of the contract work.

SECTION II: SPECIAL CONDITIONS
A) General:
(1) All of the provisions of Section I shall apply to this Section.
B) Examination of Premises:
(1) The Subcontractor shall assume all responsibility for that portion of the site involved in the project work and shall provide and maintain all necessary protection, as required by the state and local codes, ordinances, or laws. Subcontractors shall be responsible for damage caused to work that is not properly protected.
(2) The Subcontractor shall be responsible for contacting underground utility companies and communicating the hazards of underground work, and accepts the responsibility for repair of any damage to utilities.
(3) The Subcontractor shall provide enclosures, ditches, or drains to protect installation and improvements within the working area subject to damage by weather conditions, and shall repair or replace any damaged structures or improvements.
(4) Any damage incurred to existing structures or installations by the Subcontractor will be replaced and repaired to original condition at the Subcontractor's expense to the approval of the Owner's Representative.
C) Obstructions:
(1) Obstructions, if encountered, shall be reported to the Owner's Representative. Clean-up of trash, debris, or other obstructions resulting from work performed by other trades is not the responsibility of the Subcontractor.
D) Inspection of Construction Work:
(1) Periodic site inspection will be made by the Owner's Representative to determine quality and compliance of work with contract documents.
(2) Inspection of work for compliance with City codes and Standards shall be by the City Inspectors.
E) Cleaning:
(1) The Subcontractor shall remove debris, waste, rubbish, or unused construction materials from the project areas resulting from work under this contract daily.
F) Workmanship:
(1) The Subcontractor shall be responsible for providing competent workmen. All work shall be undertaken and finished in quality workmanship. Any work that does not show quality workmanship by skilled workmen, in the opinion of the Owner's Representative shall be replaced or repaired as directed by the Owner's Representative, and at the Subcontractor's expense.
G) Maintenance Period: The Subcontractor, after acceptance of the project, or portion thereof, by Owner, shall provide thirty (30) days maintenance. Maintenance shall consist of all operations necessary or required to maintain the project.
SECTION III: PLANTING OF TREES, SHRUBS AND GROUNDCOVERS

A) General: All of the provisions of Section I and II apply to this Section.

B) Scope of Work:
   (1) Contractor shall provide design-build landscape services. Contractor shall submit a preliminary
       landscape plan for review within 90 days of contract.
   (2) The Subcontractor shall furnish all materials, labor, equipment, and the performance of all operations
       necessary to complete the planting of trees, shrubs and groundcovers.

C) Certificates of Inspections:
   (1) All shipments or orders of plant material shall be inspected at the nursery or at the growing site by the
       authorized federal and state authorities. All necessary inspection certificates shall accompany the
       invoice for each shipment or order of stock, as may be required by law for the necessary
       transportation, and such certificates shall be filed with the Contractor prior to acceptance of the
       materials.

D) Plant Materials: as detailed on plans.

E) Other Materials.
   (1) Pre-emergent herbicide: Ronstar G, granular or equal.
   (2) Filter cloth at ground cover is not permitted.

F) Tree Supports.
   (1) Wood Stakes: 2"x2"x8'0" rough Douglas fir stakes, standard and better grade, free of large knots,
       prestained dark brown.
   (2) Tree guy anchors: as per industry standard.
   (3) Wire: #12 gauge galvanized wire with visibility tape.
   (4) Hose: Reinforced rubber hose. Black.
   (5) Tree Wrap: Corrugated or crepe paper, designed specifically to resist insect infestation and sun
       scald.
   (6) Protection After Delivery: Upon delivery to the site, all nursery stock shall be planted as soon as
       possible. Until planting, plants shall not be exposed to excessive sun or drying winds. Stock which is
       not satisfactory in the opinion of the Landscape Architect shall be immediately removed from the site
       at the Subcontractor's expense and replaced with acceptable stock.

G) Planting Season:
   (1) The planting of trees shall be performed during favorable weather conditions, during the season or
       seasons which are normal for such work, as determined by acceptable local practice.

H) Planting Operations.
   (1) Grades for all planting areas will be received in an "as is" condition. If mounds, swales, or fill are
       indicated on the plans, grading of these is the responsibility of the Landscape Contractor. Grade will
       be furnished at plus or minus one tenth of a foot.
   (2) Soil Preparation.
      (a) Incorporate soil additives over all planting bed areas and fully incorporate by discing, tilling,
          hand spading, or other methods to a minimum depth of 6".
      (b) Finish grade area by floating and hand raking to an acceptable smooth, even grade. Remove
          high points and fill low pockets to eliminate the possibility of standing water. All areas shall have
          positive drainage. Bring finished grade to 2-1/2" below adjacent curbs, walks and lawn grades
          to allow for the application of 2" (or as otherwise noted on plan) of decomposed granite.
   (3) Plant Locations: Prior to planting, trees and shrubs in containers will be located in accordance to
       planting plan for location approval by Owner's Representative. Failure to comply will result in removal
       and replacement of stock at Subcontractor's expense. If site conditions will not allow planting in
       approved locations, the Owner's Representative shall be notified. Before continuing work, approval of
       new locations must be obtained by the Owner's Representative.
   (4) Excavation for Planting: This shall include the excavation, stockpiling, and removal of native soil.
       Specimen tree plant pits shall be excavated horizontally and vertically enough to allow planting the
       tree at the location and height approved by the Owner's Representative.
   (5) First Backfill: Planting pits shall be backfilled with prepared backfill and be water-settled to a grade
       sufficient that, in the setting of the plant, the finish grade level after settlement will be the same as that
       at which the plants were grown.
   (6) Setting Plants: Plants shall be carefully removed from containers and set in a manner so as to assure
       that the rootball shall remain in tack as a part of this operation. Plants shall be set plumb and faced
       to give the appearance and relationship to adjacent plants and structures. Trees shall be braced, as
       required, in position until backfilling operations are complete. When planting hole is three- fourths
       filled, place planting tablets evenly spaced around each plant. Provide the following quantities per
       plant:
          (a) 4" potted plant: One 10 gram tablet.
          (b) Gallon Container shrubs up to 12-inch spread: Two 10 gram tablets.
          (c) Shrubs 15-inch to 36-inch spread: Four 10 gram tablets.
          (d) Deciduous trees, up to 1-1/2 inch caliper: Three 21 gram tablets.
          (e) Deciduous trees, 1-1/2 inch caliper: Four 21 gram tablets.
          (f) Deciduous trees, 2 inch caliper and larger: Five 21 gram tablets.
(7) Final Backfill and Fine Grading: Backfilling operations of plant pits shall be completed with prepared backfill. While maintaining the plumb position of the plant, the soil shall be thoroughly tamped and water-settled to eliminate all voids in the backfill. The wells shall be graded and planting areas shall be fine graded.

(8) Staking of Trees: Stake all deciduous trees. Refer to detail. The Contractor may provide additional staking, upon the approval of the Owner's Representative, for trees not meeting the specification of being self-supporting.

(9) Pruning: After planting, plants shall be pruned of superfluous growth, as directed by the Owner's Representative.

(10) Decomposed granite: Apply 2” (or as noted on plan) layer of decomposed granite over all planting areas after planting and rake to smooth finish grade.

(11) Tree Wrapping: Deciduous trees shall be wrapped promptly after planing to prevent sun scald, wrapping as approved by American Association of Nurserymen. Wrap spirally from ground line to the height of the second finish branches. Wrap in neat and snug manner, and fasten at bottom, top, and middle. Wrap before staking.

SECTION IV: IRRIGATION SYSTEM

A) General:
   (1) All of the provisions of Sections I and II shall apply to this Section.

B) Scope of Work:
   (1) Sprinkler systems shall be designed and constructed to the industry standard. The landscape subcontractor shall provide a submittal, see Section 32 80 00 Irrigation, of sprinkler design prior to installation. Locations of all drip emitters, shrub heads, etc., shall be established by the Subcontractor at the time of construction.
   (2) Unless otherwise specified, the construction of sprinkler systems shall include the furnishing, installing, and testing of all necessary equipment, the removal and/or restoration of existing improvement, excavation, and backfill, and all other work in accordance with the plans and specifications.
   (3) It is here specified that the system shall be a complete, operative system giving one hundred percent (100%) coverage to all plants and planted areas. System should be properly adjusted and avoid over-spray onto walk and building surfaces.

C) Examination and Verification of Drawings and Site:
   (1) It shall be the contracting installers responsibility to report to the Owner's Representative any deviations between mechanical drawings, specifications, and the site. Failure to do so prior to the installing of equipment, resulting in replacing and/or relocation equipment, shall be done at the subcontractor's expense.

D) Materials:
   (1) Whenever any material is specified by name and/or number thereof, such specification shall be deemed to be used for the purpose of facilitating a description of the materials and establishing quality, and shall be deemed and construed to be followed by the words "or approved equal". No substitutions will be permitted which have not been submitted for prior approval by the Owner's Representative. All materials shall be new and the best of their class and kind. Sufficient descriptive literature and samples must be furnished for any materials submitted as "equal" substitutions.

E) Permits and Inspections:
   (1) Any required permits for the installer or construction of any of the work included under this contract shall be obtained and paid for by the Subcontractor.

F) Record Drawings:
   (1) The Subcontractor will be required to provide the Owner's Representative a set of "as-built" plans. The General Contractor will furnish transparencies. Immediately upon installation of piping, valves, or sprinkler heads in location other than shown, the Subcontractor shall clearly indicate such changes. Before final acceptance of the project, these shall be turned over to the Owner's Representative for record purposes.

G) Changes in Scope of Work:
   (1) Additions or deletions in the quantity of work, as set forth in these specifications and accompanying drawings, may be ordered by the Owner's Representative after the Contract Price has been adjusted accordingly to the unit paid schedule. Changes made without change orders are not considered party of the contract; payment cannot be guaranteed.

H) Metering:
   (1) Provide separate dedicated meter for irrigation.

I) Plastic Pipe Line:
   (1) Plastic pipe shall be class SCH 40 PVC pipe conforming to ASTM 1785. It shall be unplasticized PVC extruded from virgin parent materials of the type specified on the plans. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, wrinkles, and dents.
   (2) All pipe shall be continuously and permanently marked with the following information: Manufacturer's name or trademark, size, schedule, and type. Working pressure of the pipe shall be as per the National Sanitation Foundation (N.S.F.) approval.

J) Plastic Pipe Fittings and Connections:
(1) All plastic pipe fittings to be installed shall be molded fittings manufactured to the same materials as the pipe and shall be suitable for either solvent weld or screwed connections. No fittings made of other materials shall be used. Fittings shall be marked with manufacturer's name, size, and schedule information.

(2) Slip fitting socket taper shall be so sized that a dry, unsoftened pipe end conforming to these special provisions can be inserted no more than half way into the socket. Plastic saddle and flange fittings will not be permitted. Unless otherwise specified, all plastic fitting shall be of PVC Schedule 40 material.

(3) All plastic to metal joints shall be made of PVC Schedule 40 male adapters or PVC Schedule 80 nipples. Joint compound for such connections shall be Permatex Type II or Teflon tape.

(4) Primer and solvent for socket connections of PVC material shall be compatible with material to be welded, as recommended by the plastic material manufacturer.

K) Polyethylene Pipe:
(1) Polyethylene pipe shall be as described on the drawings. Sizes may include .580" I.D., .375" I.D., and .125" I.D. pipe.

(2) Polyethylene pipe sizes .580" and larger shall be continuously and permanently marked with the following information: Manufacturer's name, size, material, and design strength.

(3) The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, wrinkles, dents, and variations in size.

L) Polyethylene Fittings:
(1) All polyethylene pipe fitting to be installed shall be molded fitting of plastic material. Fittings shall be compression type fittings designed or sized for use with the specific brand of pipe to be used for construction.

M) Sprinkler Heads and Risers:
(1) Sprinkler heads shall be of the types and sizes shown on the plans.

(2) All heads of the particular type of function in the system shall be of the same manufacturer and shall be marked with the manufacturer's name and identification in such a position that they can be identified without being removed from the system.

N) Emitter Installation:
(1) Emitters shall be as specified on the plans.

(2) Emitter to riser adapters shall be as specified on the plans.

(3) Emitter riser pipe shall be as per detail on the plan.

O) Plastic Enclosures for Equipment:
(1) Enclosures of equipment set below finish grade shall be plastic irrigation valve boxes and/or pits with lids, the type and size being determined by the volume of equipment to be enclosed. Enclosures shall be manufactured by Carson or an approved equal.

P) Equipment:
(1) Controllers shall be as specified on the plan. Contractors shall take special note of information on plans regarding possible duel programming capabilities.

(2) Valves, backflow preventers, and filters shall be as specified on the plans.

Q) Irrigation Control Cable:
(1) All wiring to be used for connecting the automatic controller to the electric solenoid actuated remote control valve shall be Type UF-600V, seven (7) strand or solid copper PVC insulation, single conductor, UL approved underground feeder cable. All pilot or "hot" wires are to be one color and all "common" wires are to be of another color.

(2) Connectors shall be waterproof type, as manufactured by Pentite or an approved equal.

R) Trenching:
(1) Unless otherwise indicated on the plans, all main lines shall be a minimum cover of eighteen inches (18"), and all lateral lines shall be installed with a minimum cover of twelve inches (12") based on finish grades. Sprinkler lines connecting rotor pop-up sprinklers shall be installed with a minimum cover of fifteen inches (15") based on finish grades. All plastic lines installed beneath A.C. paving shall have a minimum of a twenty-four inch (24") cover and backfill shall meet the compaction test of the area involved.

(2) Alignment of pipe shall be for a simple layout with pipe running parallel or perpendicular to features such as curbs, sidewalks, and buildings, as may be possible with on-site conditions.

S) Installation of Plastic Pipe and Fittings:
(1) Plastic pipe shall be installed in a manner so as to provide for expansion and contraction, as recommended by the manufacturer.

(2) Plastic pipe shall be cut with a handsaw or hacksaw with the assistance of squared-in sawing vise, or in a manner so as to ensure a square cut. Burrs at cut ends shall be removed prior to installation so that smooth unobstructed flow will be obtained.

(3) Solvent welded connections shall be made using primer and/or solvent compatible with pipe. Pipe sizes up to and including one inch (1") diameter shall be solvent welded. Pipe sizes up to and including one and one-quarter inches (1-1/4") diameter and larger shall be primed prior to the application of the solvent. Pipe shall be fully inserted in all sockets. Any excess solvent shall be removed from joint connectors.

(4) Threaded male adapters shall be compounded, as per manufacturer's recommendation.
shall then be hand-tightened, plus one turn with a strap wrench.

(5) Piping under paved areas shall be sleeved in PVC Schedule 40 pipe, as shown on the drawings. In other cases, piping under paving shall be installed by jacking, boring, or hydraulic driving. Where any cutting or breaking of sidewalks and/or concrete work is necessary, it shall be removed and replaced by the Subcontractor. Permission to cut or break sidewalks and/or concrete shall be obtained from those having the proper jurisdiction. Where piping on the drawings is shown under paved areas, bit running parallel and adjacent to the planted areas, the intent of the drawings is to install the piping in the planted areas.

(6) All pipe in rocky soils shall be thoroughly embedded in sand or approved top soil.

T) Installation of Polyethylene Pipe and Fittings:
   (1) Pipe shall be snaked in trenches to provide for expansion and contraction.
   (2) Except for snaking in trenches, the pipe shall not be subject to reverse curvature of the coil created at the factory.
   (3) Pipe shall be installed at the depth specified on the drawings.
   (4) At fittings, pipe shall be cut with a knife in a manner so as to ensure a square cut. Where a saddle is to be installed, a lateral line support and suitable punch for the barb shall be used to ensure proper fit.
   (5) Polyethylene pipe to be installed under paving shall be sleeved in PVC Schedule 40 pipe. Installation shall be specified of PVC pipe.
   (6) All pipe in rocky soil shall be thoroughly embedded in sand or approved top soil.

U) Installation of Equipment:
   (1) Controllers shall be installed as shown on plans. Provide minimum of two (2) controllers per zone. Upon completion of writing, the areas being irrigated by each station shall be noted individually with waterproof ink on the inside of the controller door. All wiring shall be in conformance with applicable codes.
   (2) Solenoid valves shall be installed and wired as shown on the plans. Waterproof connectors shall be installed as per manufacturer's directions. All wiring shall be in conformance with applicable codes.
   (3) Pressure regulators, filters, and fertilizer applicators shall be installed as shown on the drawings.

V) Flushing and Testing of Plastic Pipe:
   (1) Main sprinkler lines shall be tested in place before backfilling for a period of not less than one (1) hour, and shall shown no loss of water through fittings. Pressure shall be static line pressure.
   (2) After all new sprinkler piping and risers are in place and connected, and all necessary division work has been completed and prior to the installation of sprinkler heads, control valves shall be opened and a full head of water used to flush out the system. After the system is thoroughly flushed, heads shall be installed.

W) Flushing and Adjusting Polyethylene Pipe Lateral Pressure:
   (1) End caps on .580" and .375" poly pipe shall be removed and lines flushed after the installation of all fittings, risers, emitters, adapters, and laterals. Hose end shall be capped and the trench backfilled after flushing.
   (2) After flushing, if adjustable pressure regulators are specified, they shall be adjusted to twenty (20) pounds per square inch, unless specified otherwise on the plans.

X) Backfilling:
   (1) Prior to backfilling, the main line shall be pressure tested. Backfilling of trenched before testing shall be completed at the Subcontractor's risk.
   (2) The Subcontractor shall water-settle trenches and provide rough grade to match the grade condition prior to the work as a part of this section, except when trench is located under or within 5'-0" of structure or parking areas, Subcontractor will provide mechanical compact in bearing areas.

Y) Installation of Irrigation Heads and Risers:
   (1) All irrigation heads shall be perpendicular to finished grades unless otherwise designated on the plans.
   (2) All irrigation heads containing adjustable nozzles shall be adjusted for and proper distribution while minimizing overspray onto sidewalks and roads.
   (3) All nozzles on stationary pop-up sprinklers shall be tightened after installation. All sprinklers having an adjustment stem shall be adjusted on a lateral line for the proper radius, diameter, and/or gallonage.

A) Installation of Emitters and Risers:
   (1) Emitters and riser assemblies shall be installed as shown on the plans.
   (2) Emitter shall not be assembled to riser until flushing is complete. Care shall be taken prior to emitter installation and pipe kept free of foreign matter after flushing and prior to emitter installation.
   (3) Coordination of emitters with planting is a requirement. In cases where irrigation and planting is contracted to separate parties, final coordination of emitters shall be the responsibility of the Irrigation Subcontractor.

AA) Warranty-Guarantee:
   (1) Warranty shall be for a period of one (1) year, as defined in Section 01740 - Warranties and Bonds.

BB) Maintenance:
   (1) The Subcontractor shall maintain the system in proper working order.
   (2) Maintenance shall include the setting of irrigation heads to proper finish grades after turf has been established.
Section V: Decomposed Granite Groundcover

A) General:
   (1) All of the provisions of Section I and II shall apply to this Section.

B) Scope of Work:
   (1) Work includes the furnishing of all labor, material, equipment, and services necessary to complete work for this Section as indicated on the drawings and as specified and necessary to complete the construction of decomposed granite groundcover.

C) Materials:
   (1) Decomposed granite shall be native, local, desert, decomposed granite stone. Fines below one-sixteenth inch (1/16") diameter shall be kept to a maximum of thirty percent (30%) of the total volume. Granite shall be free of organic matter and other debris. The color of the granite shall be as selected by the Owner's Representative. Contractor shall provide Owner's Representative with a sample material for approval before installation.
   (2) Chemical herbicide shall be Dachtol pre-emergent or an approved equal.

D) Subgrade Preparation:
   (1) The existing grade shall be fine-grade and raked free of organic matter and other debris one inch (1") in diameter and larger. A level board not less than eight feet (8') in length shall be used to inspect subgrade for accuracy and trueness.

E) Decomposed Granite Installation:
   (1) Installation procedures for decomposed granite may vary by the scale of the size of specific areas to receive decomposed granite groundcover. Installed granite shall be dragged or raked to remove any irregularities.
   (2) Installation shall provide a compacted depth of decomposed granite as specified on the drawings. Methods of compacting, such as rolling, water-settling, etc., shall be approved by the Owner's Representative. A level board not less than eight feet (8') in length shall be used to inspect grade for accuracy and trueness. Unless otherwise specified in the drawings, granite finish grade shall be one inch (1") below the top of the curb or sidewalk surfaces. Granite shall be raked, broomed, and watered down to settle fines and dust.

F) Weed Control:
   (1) Application of chemical granite shall be sprayed a minimum of two (2) times with a minimum of fourteen (14) days between each application with weed killer prior to placement of the granite. Immediately apply pre-emergent herbicide, as per manufacturer's recommendations. A second application of pre-emergent is to be applied following placement of the granite.
   (2) Water permeable weed barrier shall be installed at all decomposed granite locations. It shall be installed to manufacturers all recommendations concerning overlap, staking, and all other recommendations.

G) Clean Up:
   (1) Subcontractor shall remove from site any debris and/or waste materials developed as a result of the work in this Section. All paved surfaces shall be clean of dirt or granite with completion of this scope of work.

H) Maintenance and Guarantee:
   (1) Areas of granite shall be maintained free of weeds, free of other debris, and true to grade until final acceptance and until completion of any contracted maintenance period.

END OF SECTION - LANDSCAPING